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NetworkWorld



May 10, 1999 Volume 16, Number 19

The network portal: www.nwfusion.com

Features

A NEW INDUSTRY BENCHMARK

Foundry's Chris Vu (left) gets his configuration straight with The Tolly Group's Tom Callies.

3Com, HP and Foundry are the price/performance kings in the first round of testing under the Network World/Tolly Group SwitchMetric program. **Page 97.**

VPN BUYER'S GUIDE

■ VPN products run the gamut, from simple encryption devices to multiprotocol tunnels. One thing they share is a lack of management finesse. **Page 85.**

■ In our test of 15 VPN products, Radguard captures the Blue Ribbon by putting a premium on interoperability without sacrificing speed. **Page 86.**

ONLINE ■ What's the best way to build your VPN? Find out how 11 vendors responded to one customer's real life VPN RFP, and weigh in on which deal you think is best (**DocFinder: 2823**).

■ Our Interactive Buyer's Guide has product specifications from 32 VPN vendors and tools that help you find what you need (**DocFinder: 2825**).

www.nwfusion.com

Sprint IONs out service prices

BY DAVID ROHDE

WASHINGTON, D.C. — Sprint's crown jewel of next-generation service, the Integrated On-Demand Network

(ION), is finally available in a myriad of potentially money-saving pricing plans.

But there's a catch: What is potentially the best ION deal

[See ION, page 140](#)

INTEROPNET

Bleeding edge booted off net

BY TIM GREENE



LAS VEGAS —

When the network industry's masses converge on Las Vegas this week for NetWorld+Interop 99, one of the exhibition's premiere attractions in previous years — a show network running on bleeding-edge technology — will be gone.

In its place will be two networks: InteropNet, a live production network built around

[See InteropNet, page 16](#)

Gigabit copper pedal to metal

Vendors ready Gigabit Ethernet over copper cards.

BY JEFF CARUSO



It's been a long, tough road for Gigabit Ethernet running over Category 5 copper wiring. But this week's NetWorld+Interop 99 could very well host the first public demonstrations of the technology.

Vendors were still scrambling

late last week to make their copper Gigabit Ethernet hardware work properly for demonstrations at the trade show in Las Vegas. Early network interface cards (NIC) from Alcon WebSystems and Packet Engines are expected to be shown, although it's unlikely that any switches will be ready.

Industry watchers have long said that developing a working Category 5 version of Gigabit Ethernet is vital to lowering Gigabit Ethernet prices and increasing the technology's acceptance. Category 5 wiring and products that support it are usually cheaper than their fiber-optic counterparts, and they are more widely

[See Copper, page 140](#)

NETWORLD+INTEROP 99

Online coverage

- Daily live broadcasts with *Network World* columnists and editors (3 p.m. PDT, starting Tuesday).
- Breaking news from the show.
- Details on our operating system showdown.

www.nwfusion.com

FIND IT 2840

Cabletron smartens up switches

BY JIM DUFFY



LAS VEGAS —

Cabletron this week will buttress its LAN switching family with new software that lets users more easily set and enforce quality-of-service (QoS) and security policies.

Also at NetWorld+Interop 99, Cabletron will unveil higher-density, higher performance LAN switching modules to support the QoS enhancements, and a new gigabit router optimized for connecting switched

workgroups to server farms. Cabletron's firmware upgrade for its SmartSwitch LAN switches will let users classify

and filter traffic based on Layer 4 information, such as port and socket numbers. This ability will

[See Cabletron, page 142](#)



On tap from Cabletron at NetWorld+Interop 99 ...

- New high-performance LAN modules for the SmartSwitch 9000 (left). The modules will cost between \$7,200 and \$21,000 and will ship in August.
- SmartSwitch 9000 Layer 4 quality-of-service and security firmware, which costs \$250 and is available now.
- A Gigabit Ethernet workgroup switch called the SmartSwitch Router 2100, priced at \$1,250 per port. It will ship in June.

ANCIENT DILEMMA

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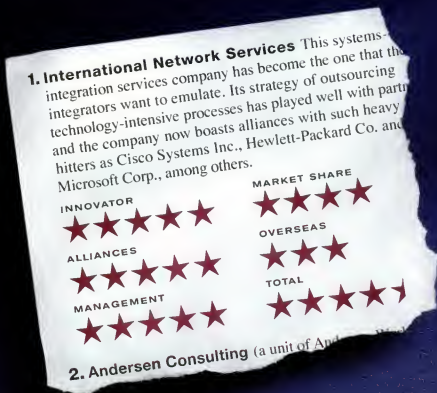
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*The knowledge
behind the network*

THIS WEEK
ONLINE



The more things
change... After 11
years at Network
World, Features
Editor Paul Des-
mond is leaving to

seek new challenges. He looks
back at networking over the past
decade and says things haven't
really changed all that much. "Yes,
technology is rapidly improving,
but many of the fundamental
issues, problems and technologies
remain the same." DocFinder: 2845

Layer 3 switches. Which switch
would you recommend for a core
net? The question lost a Fusion user
perplexed by the many choices out
there. Readers with Layer 3 experi-
ence rushed to give their advice.
See what they recommend — and
add your own comments.
DocFinder: 2846

E-commerce. Want to set up shop
online? Our E-commerce section
provides everything from the latest
electronic commerce news to user
stories. DocFinder: 1707

Keeping Current. Yes, Virginia, there
are monopolies. Fred McClimens
looks at all the
AT&T/MediaOne/
Microsoft maneu-
vers and predicts
that the winners in
the next big services
war will be the same companies that
won the last battle. DocFinder: 2844



Going to N+1? We'll be experimen-
ting with some live conferencing at
the show. At 3 p.m., Tuesday
through Thursday, Senior Online
Reporter Sandra Gitten will lead a
live CU-SeeMe broadcast featuring
the latest news and comments
from Network World columnists
and editors, including Mark Gibbs,
Dave Kearns and Joel Snyder. If
you want to watch, or just say
hello, stop by booth 2630.
DocFinder: 2840

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NetworkWorld

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VPN Buyer's Guide



Virtual private networks products run
the gamut from simple encryption
devices to multiprotocol tunnelers.
One thing they share is a lack of
management finessa. Page 85.

In our test of 15 VPN products Radguard
captures the Blue Ribbon by putting a
premium on interoperability without
sacrificing speed. Page 86.

Eleven vendors respond to a reader's VPN RFP. Add
your thoughts on which is offering the best deal.
DocFinder: 2823.

Our Interactive Buyer's Guide has product specifications
from 32 VPN vendors and tools that help you find what
you need. DocFinder: 2825.

Chat with Network World Test Alliance member Joel
Snyder, who'll be online all week fielding questions and
offering VPN commentary. DocFinder: 2822.

Check out case studies and tips from new VPN adopters to
make your implementation easier. DocFinder: 2822.

FEATURES

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3Com, HP and Foundry are the price/performance kings in the
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COOL TOOLS: Vege Technologies' Buddy System
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FACE-OFF: Extreme Networks CEO Gordon Stitt argues
that you're better off letting a specialist fulfill your LAN equip-
ment needs, while 3Com Vice President Andy Gottlieb says it
takes a full-spectrum provider to cover all the bases. Page 83.

NEWS BRIEFS, MAY 10, 1999

Lockheed Martin flies into broadband business

Lockheed Martin last week announced a partnership with TRW and Telecom Italia to develop a \$3.6 billion satellite company called Astrolink that will provide global, broadband multimedia and Internet access for business and consumer use. Lockheed Martin says its Global Telecommunications Group will invest \$400 million in the venture. Telepiatto, part of Telecom Italia, and TRW will each invest \$250 million. Astrolink plans to launch the first of nine satellites in 2002 and hopes to provide broadband data communications services to Europe, North America and South America by 2003.

AT&T digests IBM Global Network

The venerable IBM Global Network is now called AT&T Global Network Services — at least in the U.S. AT&T last week completed its acquisition of the IBM net domestically, with customer contracts and 3,000 employees moving over to AT&T. Significantly, AT&T then put the entire business in its rapidly growing AT&T Solutions division, signaling the company's determination to continue to push managed networks and outsourcing along with its new network assets. Closing the IBM Global Network deal in other parts of the world depends on regulatory approval and other matters, AT&T officials say.

Kennard wants E-rate funding

Federal Communications Commission Chairman William Kennard last week pushed for full funding of the E-rate program to provide network services subsidies to schools and libraries. That means the program would get \$2.25 billion over the next school year — the maximum allowed by law — compared with about \$1.3 billion for the current school year. E-rate ran out of money this past year, meaning it could provide funding for carrier services but not LAN and WAN equipment at schools in relatively wealthy districts. Kennard is expected to get a fight over his proposal, as many lawmakers have criticized E-rate for its administrative complexity. Lawmakers also have attacked E-rate for funding many regular phone services in addition to "Net access, and because it has resulted in additional charges on all phone bills.



FCC's Kennard seeks more funds for E-rate.

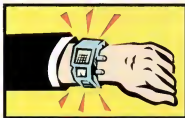
Informix gets a new boss

Bob Finocchio last week said he will step down as president and CEO of database vendor Informix but will continue in his role as

chairman of the company's board. Replacing Finocchio will be Jean-Yves Desmiers, currently executive vice president of worldwide field operations and previously Informix's chief financial officer. The transition, which includes Desmiers being appointed to the company's board of directors, will be effective July 16.

Dick Tracy's futuristic technology becomes a reality

Faced with battling the likes of Wraithful Ralph and Piggy Bank, Dick Tracy could always phone for help or get evidence via his



trusty watch. The voice- and video-enabled watch, first introduced in the comic strip in 1946, has been only a dream — until now. Researchers at Bell Labs/Lucent have mastered the technology that could make a Dick Tracy watch possible. They have created a minuscule, 100-micron microphone on a chip, which could lead to the voice and video recognition Tracy relied on.

MCI/NexTel deal no more

It's official: MCI WorldCom will not buy Nextel Communications, the McLean, Va., wireless service provider. MCI WorldCom did not offer any more detail other than to say in a printed statement: "MCI WorldCom has determined not to pursue a bid for Nextel at this time." But rumor has it that the two companies could not come to an agreement on a price. MCI WorldCom never acknowledged it was in talks with Nextel until last week when MCI WorldCom killed the potential deal.

Your digital John Hancock

Your written signature will stand up in a court of law, but will your electronic digital signature? Last week, lawmakers took the first step to make digital signatures legal and binding by introducing The Electronic Signatures in Global and National Commerce Act, dubbed the "E-Sign" bill. Introduced by Reps. Tom Bliley (R-Va.), Tom Davis (R-Va.), Billy Tauzin (R-La.) and Mike Oxley (R-Ohio), the legislation provides for the acceptance of electronic signatures for interstate commerce and the securities industries. The bill defines technological neutrality and says private parties should be able to pick the forms of electronic signatures that they prefer.

Qwest wins voice, data contract with Walgreens

Frame relay, circuit-switched voice services represent IP carrier's typical entry into enterprises.

BY DAVID ROHDE

DEERFIELD, ILL. — If Qwest isn't the first carrier you think of when it comes to frame relay and old-fashioned circuit-switched voice, it may be time to reassess your assumptions.

The new national carrier made its most recent sale of surprisingly traditional network services last week when it bagged Walgreens, the nation's largest drugstore chain, in a \$9 million contract. The principal loser in the deal: MCI WorldCom.

In the past, Walgreens has split its data-network traffic at least three ways — among AT&T and MCI WorldCom frame relay networks, and a separate satellite network. Now Qwest will provide frame relay connections to 465 stores, replacing the MCI portion of the network and extending frame relay to some new sites, according to Pete Szabo, a Qwest senior applications engineer. The AT&T and satellite data nets will remain in place, he says. Walgreens officials did not comment, but an MCI WorldCom spokesman confirmed the loss.

On the voice side, Qwest scored even bigger. The carrier will provide Qwest VNS — a traditional circuit-switched virtual private network (VPN) in which intracompany calls travel over a national net — to all 2,700 of Walgreens' stores, distribution centers, district offices and affiliated locations.

The Qwest frame relay network will carry point-of-sale applications, such as credit card verification, plus other traffic. The frame network itself will be quite conventional, with groups of 40 stores each using basic 56K bit/sec frame relay ports connecting to a 512K bit/sec port at one of Walgreens' data centers.

Qwest officials say they were able to offer Walgreens an especially attractive deal because they combined voice

and data traffic on a single contract. Without giving exact numbers, Qwest confirmed the price Walgreens will enjoy is substantially below Qwest's official \$190 per month 56K frame relay price. Even the \$190 figure undercuts frame relay prices from AT&T, MCI WorldCom and Sprint (NW; Dec. 14, 1998, page 1).

Qwest on a roll

Besides winning Walgreens' business, the new national long-distance carrier has won over the following large organizations:

- ADP
- Boeing
- Cox Communications
- Delta Airlines
- Ford
- Microsoft
- REMAX
- U.S. Department of Treasury

Publicly, Qwest has promoted its broadband IP capabilities, including a voice-over-IP service. And Qwest officials say Walgreens and other new Qwest customers like the option of eventually migrating to these IP services, even though the services are not yet fully defined.

Yet behind the scenes, Qwest has carefully laid a plan to capture initial enterprise network business using more traditional technologies. CEO Joe Nacchio has acknowledged many large enterprise networks are likely to migrate slowly to full-featured IPvPNs, and he has called Qwest's traditional telecom offers a process of "feeding the quacking ducks."

Mack Greene, Qwest's vice president of voice and data product management, says more such deals are in the pipeline. "I'm carrying a big bag of duck feed," he quips. □

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Novell chomps on 64 bits

BY ROBIN SCHREIER HOHMAN

PROVO, UTAH — Key pieces of Novell's 64-bit strategy are beginning to emerge, with the company planning to break off parts of NetWare for use on network appliances that don't require NetWare.

Novell will ship the pieces of NetWare that provide caching, directory and storage services for 64-bit Merced chips before the company ships a full-blown 64-bit operating system. The services will run on servers and appliances that are part of OEM deals, such as the one Novell has with Compaq and Dell for 32-bit Internet Caching Services.

With its 64-bit strategy, Novell will be attacking Microsoft on two fronts, in the network operating system and network services markets, attracting customers without necessarily forcing them to choose between NT and NetWare. The firm has said it will develop tools to help users run Microsoft's Active Directory alongside Novell Directory Services.

The 64-bit products are targeted for Intel's Merced

processor, which is expected to ship in mid-2000. Novell is hoping to ship the software chunks at the same time. Novell isn't saying when — or if — it will port NetWare services to run on Compaq's 64-bit Alpha processor.

Novell is taking out network services and putting them on appliances, in part to help identify NetWare as a Web operating system. A Web operating system, according to the

WebOS Web site at the University of California, Berkeley, provides a common set of operating system services to wide-area applications. Those services include naming, authentication, security and resource management.

NetWare 5 still alive

Hoping to drive deeper into Web territory, Novell will release several enhancements to NetWare 5.0 that support

Web-based communication. The effort is dubbed Cobra, and among other things, it will support HTTP as a protocol. HTTP is the communications protocol used to process Internet traffic.

Currently, the NetWare Core Protocol (NCP) in Version 5.0 runs over IP or IPX, but not HTTP. Novell also will publish the communication APIs to give developers access to the NCP features for fine-tuning NetWare. The company has no plans to publish the security APIs.

Support for HTTP will also enable NetWare to work with Office 2000 and Windows NT. Novell hasn't announced shipping dates yet for any of the pieces of Cobra.

The next full upgrade of NetWare, code-named 6 Pack, will let services run across multiple processors, says Brian Faustyn, director of product marketing for NetWare. Right now, the NetWare 5.0 kernel can take advantage of multiple processors, but services such as ICS, NDS and NetWare storage can't.

A NetWare 6 memory fix

The 6 Pack upgrade will also be able to scale better, supporting more than 4G bytes of memory on the server. In addition, 6 Pack will support quality of service for

applications, Faustyn says. Novell hasn't yet set a date for release.

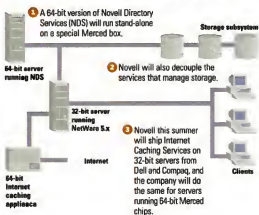
Like the 64-bit services, the components of 6 Pack will be released in parts. The strategy comes from a mandate from Eric Schmidt when he took over as CEO, Faustyn says. Schmidt's idea is to develop smaller pieces of code and to ship them faster than Novell could ship a fully grown operating system.

The strategy is designed to also help Novell attract a base of non-NetWare customers. "Novell has to create products that are sort of outside the traditional NetWare box," says Jamie Lewis, president of The Burton Group. Lewis says that in order for Novell to succeed, the company also has to release the tools that make it easier to run NT and NetWare together. One key tool, he says, would be a utility to help Microsoft's Active Directory run alongside NDS, because Microsoft seems to be designing Active Directory to be specific to Microsoft products.

Novell's current strategy — to make NetWare more compatible — seems to be working, Faustyn says. NetWare 5.0 was the first version to support IP and IPX, Novell's proprietary transmission protocol. ■

64-bit NetWare

A sample implementation of a 64-bit NetWare network:



Microsoft brews microbrowser

BY JOHN COX

REDMOND, WASH. — Microsoft has just begun trials of a portable microbrowser that lets wireless smartphones access parts of the Web.

The unnamed product will ship to phone makers by June, giving Microsoft a badly needed presence in the burgeoning wireless handset market. The company faces uncharacteristically stiff competition from other software vendors, such as Symbian, that also want to sell software to connect millions of wireless phones to Internet-based services.

"The microbrowser is an attempt to give smartphone users a Microsoft experience in accessing the Web," says Jill House, a research analyst with

International Data Corp. in Framingham, Mass. "Windows CE is not ready yet for this type of market. CE is still too bulky and lacks real-time features. The microbrowser is an interim way for Microsoft to get into this fast-growing market."

The next generation of wireless phones is being equipped with microprocessors, tiny screens, some extra memory, operating system software, TCP/IP software and HTML Web browsers. Meanwhile, telcos are prepping an array of Internet-based, general and industry-specific information services, including access to corporate groupware and e-mail servers.

There are rival microprocessors. Symbian licenses one from STNC, Ltd., a software vendor based in the U.K.

Phone.com, formerly Unwired Planet, of Redwood Shores, Calif., likewise has a microbrowser, based on the Wireless Application Protocol Forum specification. Microsoft partner and wireless phone maker Qualcomm currently uses this browser but will also use the Microsoft product when it becomes available.

The Microsoft software will support the network interface, cache data locally and manage the display and input. The software will include an HTML renderer and eventually will support Extensible Markup Language, which is fast becoming the standard for representing data on Web pages.

The Microsoft browser will also include a telephony API to blend the browser functions

with the core cellular phone capabilities, says Phil Holden, group product manager for Microsoft's productivity appliances division.

In most cases, the microbrowsers won't be used for PC-like Web browsing because

many of the handset screens display only a few lines of text.

"It's fine for certain types of things, like getting a short message or stock quotes or checking an airline reservation," says Jeff Bell, vice president of marketing for Qualcomm. ■

Microsoft's microbrowser

Microsoft's portable HTML microbrowser is now in trials and will ship to handset manufacturers by June. The software, for accessing specialized Web information from various kinds of wireless smartphones, will give Microsoft a presence in a fast-growing market.



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Circle 11 on Reader Service Card

Start-up Sirocco to feed fiber networks

From Sahara to Sirocco, entrepreneur Jonathan Reeves is at it again with an edge device start-up.

BY TIM GREENE

WALLINGFORD, CONN. — Jonathan Reeves likes to live life on the edge.

First he was at the edge of public ATM networks, and now he is at the edge of dense wave-division multiplexed networks running on optical fiber.

Reeves founded Sahara Networks in 1995 to build access concentrators that took voice, video and data traffic from customer sites and dropped the traffic onto public ATM networks. Cascade Communications bought out Reeves for \$210 million 18 months after Sahara was born.

Now with his new venture, Sirocco Systems, Reeves plans to make a box that takes in the same kind of customer traffic and drops it directly onto service providers' fiber-optic backbones.

Sirocco's boxes will serve as gateways between customers' existing gear and the high-bandwidth optical networks that carriers will use to provide a new breed of services.

Reeves says his change in focus comes down to just following advances in technology. "The core network has undergone dramatic change," he says. "It was a frame relay core, then an ATM core; now it is an optical core."

In returning to the edge, Reeves brings along Tom Shay, who helped him start Sahara. Sirocco's headquarters, staffed by 20 people, is just a few miles from Sahara's Wallingford, Conn., base.

Even the names are linked. Sirocco is a hot wind that blows through the Sahara Desert. Sirocco and Sahara are also the names of cars — Sirocco is a Volkswagen and Sahara is a Jeep. Founded in January, the company just received \$9 million in venture funding from Bessemer Venture Partners and Greylock.

Sirocco's goal is to produce access concentrators that can switch legacy traffic to whatever protocol is being used on the fiber, whether it's SONET,

ATM, IP or some combination.

The trouble with optical networks is that they can speed bits along a single color of light, but they lack the intelligence to sort out traffic types.

"Optical networks are pro-

tocol-dumb," Reeves says. "At the edge, you need a dual personality: know optics, but also electronics to handle existing protocols."

The electronic half of Sirocco concentrators will

have familiar network interfaces from T-1 to OC-48, he says. Those ports will connect to customer network gear. Ports to the network service provider will be optical and feed multiple wavelengths of light onto individual fibers.

The traffic coming into the Sirocco box will be sorted and sent along the appropriate wavelength into the optical network.

Each uplink wavelength will represent a different destination, such as a long-distance network, a public IP or private network.

Initially, the Sirocco boxes would be used between service provider networks. An ISP buying long-haul trunking bandwidth on another car-

rier's fiber network might use such a device to transfer traffic onto the long-haul carrier's network. Sirocco would provide what Reeves calls an optical User-Network Interface (UNI).

That interface could be SONET or something new, such as ATM or IP directly on the fiber — what Reeves calls packet over photon. Rather than using SONET for features such as performance, monitoring and failure notification, the features would be handled by enhanced packet technology, he says.

Later, as optical networks become more common and bandwidth prices drop, Sirocco concentrators will sit at corporate sites and act as the optical UNI between enterprises and carriers, Reeves predicts.

A product built to phone company standards will be ready sometime next year, he says.

Sirocco: (203) 269-9919

PROFILE: SIROCCO SYSTEMS

Based: Wallingford, Conn.

Founded: January 1999

Products: Optical access concentrators (under development)

Employees: 20

Funding: \$9 million from Bessemer Venture Partners and Greylock

Competitors: Lucant, Symcor

Fun fact: Founder Jonathan Reeves' former start-up was called Sahara, and Sirocco is a hot wind that blows through the Sahara.



Founder Jonathan Reeves

IBM to roll out directory of directories

BY MARC SONGINI

LAS VEGAS — IBM this week is expected to unveil software for building massive directories that can store and serve up the data needed to support security and policy-management schemes across multivendor networks.

The company's unnamed offering, which IBM plans to announce at NetWorld+Interop 99, will serve as a directory of directories, presenting a consolidated view of information stored in assorted directories across a network. The company's metadirectory product will use the Lightweight Directory Access Protocol to tap into information repositories, such as Novell Directory Services, and directories associated with specific applications, such as Lotus Domino.

Directories are considered to be crucial components of companies' network management and security strategies. Network executives can store everything from end-user profiles to digital certificates to phone numbers in directories

and then can use that information when defining quality-of-service parameters and network access rights. A meta-

NETWORLD+INTEROP 99

directory can be used to update the individual directories scattered across a network when data changes and to synchronize data across separate directories.

Metadirectories are needed by large enterprises in particular because such companies each average more than 100 separate directories, says Jeff Jaffe, general manager of the IBM SecureWay division, formerly called the eNetworking Division. Consolidating data from separate directories can make it easier to find and manage network resources, he says. IBM Global Services already works with users to design customized metadirectories. Customers will be able to configure the new directory product themselves.

Jaffe says IBM's metadirectory stands apart from others

because of the scalability and professional services the company offers.

IBM's software runs atop the company's DB2 database, which runs on platforms ranging from Windows NT servers to S/390 mainframes and can store up to 11 terabytes of data. The metadirectory takes advantage of DB2's join engine to make connections between data in different directories and to consolidate such data.

IBM's metadirectory could

prove useful to customers heavily involved in electronic commerce, says Michael Marquardt president at Internet Operations Center, a Detroit ISP and outsourcing firm that caters to the car industry. Such an information repository could be key to supporting network security policies, he says.

The technology might fit well in Marquardt's network, which contains separate directories for AOL, Sirius and other machines.

"The whole directory puzzle is a big deal," he says. "People maintain a variety of directories, and the Holy Grail is to have them integrated."

Pricing for the product was not available. □

Showdown lowdown

Where: Tuesday, May 11, 10:30 to noon

Where: NetWorld+Interop 99, Las Vegas Convention Center, Room N2-46

Participants: Tanya van Dam, group product manager for Windows NT Server; Microsoft, Drew Major, chief scientist; Novell; Richard Green, vice president of the Solaris product line; Sun Microsystems; Tamar Newberger, director of server product marketing; The Santa Cruz Operation; Erik Troan, director of engineering, Red Hat Software

Panel members: Christine Burns, Test Alliance director, Network World; Nick Petreley, editorial director, Linux World

Moderator: John Gailant, editor in chief, Network World





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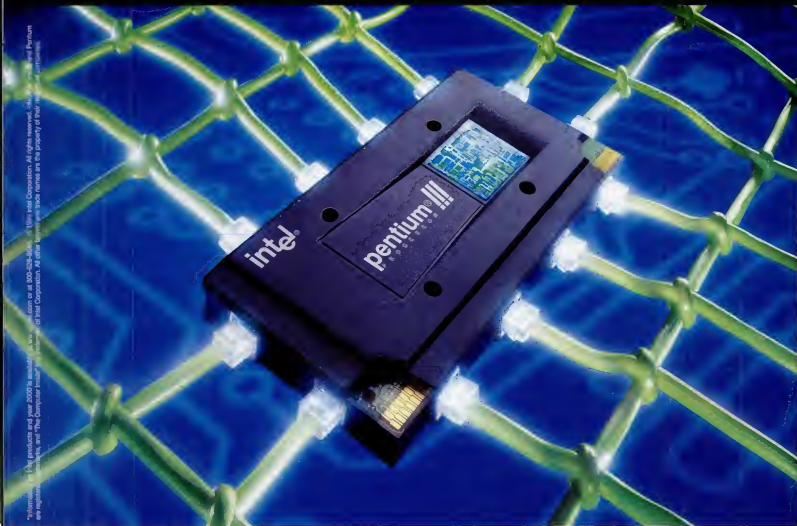
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The Computer inside.™

Mgmt. tools will blanket N+

BY JEFF CARUSO

LAS VEGAS — Management software of all varieties will premiere at this week's NetWorld+Interop '99 trade show.

Much of the activity will center on products for application and systems management,

ing software. "The issue is how much time you have to spend with it," McConnell says.

Here is a sampling of planned announcements:

- Savant will take the wraps off of a performance management product called QSensor. The software collects response-time information

will be able to write scripts in Perl and download them for the HARMONI agent to execute. This way, the agent can collect the specific information the script requested, such as the applications running on a server or the server's CPU and disk usage.

- Compuware will unveil EcoScope 4.0, a tool for troubleshooting and monitoring the performance of networks. EcoScope has been completely rewritten to scale up to larger networks, going from a maximum of 22,000 nodes to as many as 100,000, Compuware says. Software probes now feed data to probe managers, which filter the data and present various levels of detail. The new version also uses Microsoft SQL Server to store data over long periods of time and to report trends.

Management Bonanza

Pricing and availability of various products being introduced at NetWorld+Interop:

Vendor	Product	Price	Availability
Appitude	Visualizer	Around \$100,000	June
Compuware	EcoScope 4.0	Starts at \$38,500	June
NDG	HARMONI agent	\$295	July
Savant	QSensor	Starts at \$25,000	Second half 1999
SMARTS	InCharge Switch Connectivity Manager	Starts at \$25,000	June
X-Cel	Net-Tell Database Query	Starts at \$20,000	Now

- System Management Arts (SMARTS) will announce software to help diagnose problems in LAN switches. InCharge Switch Connectivity Manager checks for failures in Spanning Tree Protocol or virtual LANs. It discovers the network topology and uses that information to help figure out where the root cause of the

problem is.

- Appitude will enable its Visualizer tool to recognize multimedia, streaming video and audio traffic.

Visualizer is a probe that tracks application conversations and captures data from those conversations so that a network manager can analyze the data and find problems. The product can now isolate traffic using the International Telecommunication Union H.323 standard for transmitting audio and video over IP.

- X-Cel Communications will add report-generating capabilities to its Net-Tell Database Query software, which monitors bandwidth usage. The reports can show performance trends, indicate when bandwidth usage exceeds thresholds set by the user, and predict when problems might occur. Savant: (301) 581-0520; NDG: (619) 350-4815; Compuware: (248) 737-7300; SMARTS: (877) 276-2787; Appitude: (408) 574-2300; X-Cel: (781) 238-0256

NETWORLD+INTEROP 99

network performance reporting and protocol analysis.

Sifting through all the new products may be difficult, says John McConnell, president of McConnell Associates in Boulder, Colo. But network managers might start by looking at how much time the software will save them vs. how much time they will have to spend writing management rules or configuring

from software probes on servers, clients and network segments. Over time, it establishes a baseline of normal activity. If response time greatly deviates from the norm, QSensor alerts network managers.

- NDG Software will introduce a Remote Monitoring (RMON) 2 agent that is programmable. Network managers

Windows 2000 Beta 3 gets good early marks

Fewer crashes, heightened security management among features cited.

BY JOHN FONTANA

While most of the 650,000 testers are still waiting for Beta 3 of Windows 2000, more than 20 Microsoft customers already have it up and running in production.

Production use of beta code may not be for the faint of heart, but one enterprise is reporting encouraging early returns on performance.

Jason Bruner, a systems administrator for VoiceStream Wireless, has had Beta 3 running on some of his production file servers for the past two months. As of last week, the software had been up for 782 hours continuously without a failure or reboot.

Improved beta

"We are in the habit of trying to break things, but this is working well," Bruner says. "Beta 3 is nothing like Beta 2. Beta 2 was buggy."

Bruner says Beta 3 also has solved past problems with major memory leaks and is roughly 35% faster than NT 4.0. "The file system, security management and application api-

tude appear real rock solid," he says. Bruner says his domains and security permissions are down to one architecture, from three previously.

All of that is welcome news to NT users who plan to move

so bad for some net administrators that the administrators have had to move some of their mission-critical applications, specifically electronic commerce, off the platform.

Joe Page, chief technology officer for Value America, says he plans to ditch NT in the near future because "NT can't handle high-volume electronic commerce very well at all."

Switching to Unix

For more than a year, Value America, a Charlottesville, Va., online retailer, has used 30 NT-based Internet Information Servers to support online Internet sales. The servers handle several hundred visitors every few minutes, but crash all too frequently, according to Page. "We constantly have to reboot the NT boxes," Page says, noting he will definitely switch to Unix.

Similar concerns run deep among other NT users.

"Even for strong NT shops, Active Directory is not the key. What [the shops] want is a server they don't have to reboot every seven days," says John Kretz, president of Enlightened Point Consulting Group.

Notes from the firing line

A handful of Microsoft customers are running Windows 2000 Beta 3 in production. One user has had it up and running for two months with some encouraging results, such as:

- 782 hours of operation without reboot or failure.
- Elimination of major memory leaks.
- Domain and security permissions condensed to one architecture.
- Increase in the number of connected peripherals.

to Windows 2000 when it ships sometime this year. NT's Achilles' heel has been its propensity to force network administrators to suffer through routine reboots and mysterious crashes.

The NT problems have been

Be a Net Know-it-All

For the latest news, information and more on NetWorld+Interop and NetWorld+Interop 99, visit the www.nwfusion.com website.

This week's question:

Which well-known network product are Jeff Hawkins and Donna Dubinsky credited with creating?

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Senior editor Ellen Messner contributed to this article.

If your IT Management solution fails,
which thank-you gift will the boss be sending you?



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The word is out. Far too many enterprise management projects don't deliver. So, what's the hang up? Recent industry analyst studies reveal that most major framework implementations take too much time and don't deliver ROI. After years of work, only a small portion of purchased functionality is actually implemented. There is a better way.

HP OpenView delivers measurable, proven results quickly and completely. A new independent head-to-head lab test* revealed "HP delivers on the promise of integrated tools to solve specific problems... Unlike PLATINUM, CA and Tivoli, HP has not overloaded its solution with a common framework... HP's generally flawless solution sets the mark against which to measure all other out-of-the-box functionality".

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InteropNet, continued from page 1

more stable technology, and InteropNet Labs, a separate net for controlled demonstrations and lectures deemed not ready for prime time.

In previous years, the Interop network was always a sort of showcase — carrying real traffic among hundreds of exhibitor booths and out to the Internet. People attending the show got the chance to see the most talked about new technologies work — or not work — in an environment similar to that of a corporate network. Not anymore, say longtime volunteers in the show's network operations center (NOC).

"InteropNet is no longer really demonstrating anything," says Tripp Lilley, who is a NOC member in charge of addressing. "It used to demonstrate interoperability, both in the

sense of vendors interoperating and in the sense of technologies interoperating — the old with the new."

The show network has traditionally been IP-based and has used the most advanced switching and routing technology available. One year the underlying transport was ATM, another

eight other vendors: Check Point, Computer Associates, Fluke, Hewlett-Packard, Liebert, Novell, Shomiti and Quest.

Detractors say the dual network scheme can't prove the latest gear actually works in a live network the way former InteropNets did.

Show organizers disagree.

NETWORK+ INTEROP 99

FDI. This year Gigabit Ethernet is the transport of choice.

Now, though, all of the hottest technology — dense wave division multiplexing, Gigabit Ethernet over copper, voice over IP, virtual private networks — will be segregated to the InteropNet Labs network.

InteropNet, the network that exhibitors will actually use, is based on off-the-shelf Cisco hardware supported by management, firewall and intrusion detection products supplied by

saying the network split gives attendees a better chance to learn hands-on about the latest hardware and software. Because the gear won't be tied up running real traffic, people will have the chance to tinker with it.

"Attendees can interact with technologies and interact with engineers who work on them,"

old InteropNet. The show Web site describes the lab as a place "where truly bleeding-edge technologies can be tested and proven without the constraint of being required to work."

In the past, vendors who put their gear through the rigors of InteropNet hastily fixed flaws and weaknesses that InteropNet exposed, speeding the rate at which technology matured.

For example, one year at the Las Vegas NetWorld+Interop show, InteropNet revealed that video multicast traffic was swamping the ATM network's broadcast-and-unknown servers (BUSs). "By the time the Atlanta show rolled around that year, that problem was fixed in all the vendors' BUS servers," Hultquist says.

And vendors lament the new arrangement. For instance,

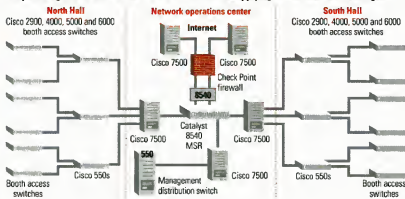
from corporate enterprises who consider themselves to be the network elite. Membership was by invitation only and only after volunteers proved they could produce under pressure, Lilley says. This year their number has slipped from more than 30 to fewer than 10, with the slack being picked up by vendor staff.

The NOC team was so dedicated that one member, Martin Gear, was designated to make sure the rest didn't push themselves to exhaustion. "I once had two burly volunteers bodily haul the chief engineer off the show floor, escort him to his hotel, turn off his cell phone, turn off his beeper and put him to bed," Gear says.

That's when he created the 5-2-1 rule: In every 24 hours,

InteropNet or CiscoNet?

InteropNet features a Gigabit Ethernet backbone from Cisco for handling booth-to-booth connectivity and providing exhibitors with Internet access. Cisco is supplying off-the-shelf backbone gear.



says Steve Wilkey, director of network operations for D2 Events, which runs the show. Before, those engineers were too busy running InteropNet to talk.

But a test environment can't provide as thorough a work-out as a live production network, says Steve Hultquist, a veteran of 15 InteropNets. Once gear is in a real-world net, people put demands on equipment that engineers never thought of, he says.

"The old tag line was I know it works, I saw it at Interop," Hultquist says. "Now you won't know it works. It's not real if it's in the labs. And if it's in the production network, well of course it works; it's [primarily] one vendor's stuff."

Even show literature acknowledges that InteropNet Labs is less challenging than the

Fluke, which makes test gear used in InteropNet, regarded the old format as an extension of its research and development efforts, says Neal Allen, Fluke product marketing manager for LAN meters.

Because Fluke got to test other vendors' alpha and beta equipment, it got a six- to 12-month jump on developing new test gear, Allen says. In addition, Fluke engineers would observe NOC volunteers using new Fluke test equipment. Based on what the engineers saw, they would change features to make the test gear easier to use, Allen says. "InteropNet has caused us to make considerable changes to products. Now about a third of the R&D opportunity is gone," he says.

Also gone is the culture of the NOC, a group of volunteers

each NOC team member has to sleep for five hours, eat at least two meals and take one shower.

"I believe we called it network camp for geeks," Allen says. "You go there, have a lot of fun, see all your friends, play with all the latest toys — and then you go home."

Hultquist holds his NOC membership in such esteem that he has registered netcom.com as his domain name. Lilley has NOC team plaques hanging on the wall in lieu of academic diplomas. He mourns the passing of the old InteropNet.

"I grieve, both personally and professionally. You've lost a window into an admittedly strange but telling reality," Lilley says. ■

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Here are this week's questions. Enjoy.

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2. Greatest invention/discovery of all time
3. Favorite sports hero (living or dead)
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5. Funniest TV sitcom of all time



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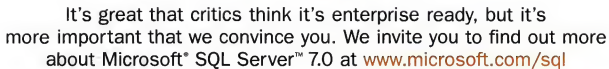
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Briefs

Bull Information Systems has introduced three servers bundled with applications for either remote access, Web serving or storage management.

The Express5800 Remote Access Server includes a modem that provides remote offices and mobile users with access to corporate e-mail systems and the Internet. The Express5800 Cyberprise Web Application Server lets firms deploy Web services. It is equipped with Well Data's Cyberprise Server and Windows Host software, as well as Windows NT, Internet Information Server and SQL Server database. The Express5800 Storage Resource Management Server monitors the capacity, utilization and availability of disks, RAID subsystems, partitions and directories in NT environments.

Bull's Express5800 servers are available with Pentium II, III and III Xeon processors and up to 2M bytes of Level 2 cache. Bull offers as many as eight processors per server. The servers support disk capacities of more than 700 bytes.

The Remote Access Server starts at \$12,000, the Cyberprise server at \$17,500 and the storage management server at \$5,400.

Bull: (978) 294-6000

Computerterm has announced a device that mirrors data between mainframes and disks across WANs. The VMC 8800 Remote-Copy box connects to a remote mirroring control device attached to a mainframe's Enterprise Systems Connection (ESCON) channel. The 8800 runs 17M bytes/sec ESCON traffic over a T-3 or OC-3 WAN to another 8800, and from there, to another mirroring control device attached to a mainframe or storage devices.

Computerterm claims its technology has no distance limitation.

The device is available this month and starts at \$50,000.

Computerterm: (800) 873-0303

Adtran puts emphasis on the enterprise

BY TIM GREENE

LAS VEGAS — Looking to shed its image as a maker of carrier gear only, Adtran this week will begin calling more attention to its enterprise WAN gear with the formation of a new unit dedicated to this market.

NETWORLD+INTEROP 99

The Enterprise Networks Division, which will oversee Adtran's DSU/CSU, ISDN router and T-1 access equipment lines, makes its debut at NetWorld+Interop 99.

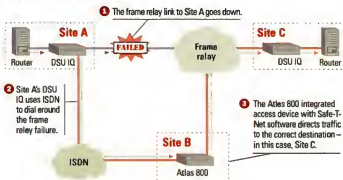
The group will celebrate by introducing new software that helps customers back up their frame relay networks. In the event that a frame relay connection breaks, the product lets customers route traffic over ISDN links, which can be less expensive than redundant frame relay connections.

"It makes good sense for backing up your frame relay network, assuming the ISDN is available in the locations needed at a reasonable price," says Tim Smith, an analyst at Dataquest.

Since the AT&T frame relay network crashed last year leaving entire corporate networks down for hours, net executives have been seeking new frame

Finding an alternate route

New Safe-T-Net software for Adtran's Atlas 800 can get your traffic to its intended destination even when frame relay lines are down.



relay backup options.

Adtran's new Safe-T-Net software can be used to upgrade an existing Adtran Atlas 800 integrated access device. The new technology enables the Atlas 800 to handle traffic from up to 96 backup connections. Typically, traffic would be sent to the Atlas 800 via ISDN from Adtran DSU/ISQs or Express frame relay access devices at remote sites. The Atlas 800, receiving the traffic over ISDN Primary

Rate Interface connections, would direct traffic to its destination or destinations via healthy frame relay lines or other ISDN links.

Dataquest's Smith warns that ISDN rates vary widely depending on the carrier, so customers should check local rates for ISDN and compare them to local rates for buying redundant frame relay connections from two different carriers.

See Adtran, page 22

Cisco tool eases management of legacy networks

SNA View 2.0 lets users monitor mixed SNA and TCP/IP nets from a browser.

BY MARC SONGINI

RESEARCH TRIANGLE PARK, N.C. — If you are looking for a simple way to manage your mixed SNA and TCP/IP networks, new software from Cisco may help.

The company last week rolled out SNA View 2.0, which lets network executives use a browser to monitor, track and troubleshoot SNA and TCP/IP sessions. Typically, users with SNA and IP nets must monitor each from a separate screen, making it difficult to locate and solve problems.

The previous version of SNA View, 1.0, could not monitor SNA 3270 sessions or Data Link Switching (DLSW) traffic. DLSW lets SNA traffic run over a TCP/IP backbone.

From a browser, SNA View 2.0 customers can monitor SNA traffic, such as 3270 and Advanced Peer-to-Peer Networking, or IP-oriented SNA traffic, such as tn3270 and DLSW, running through the mainframe or Cisco's routers. Tn3270 technology lets PC users access SNA resources

over IP networks.

SNA View 2.0 runs on a Unix Web server and extracts SNA network data from the mainframe by tapping into Virtual Telecommunications Access Method (VTAM), the program that controls SNA communications with a mainframe. To access IP router and tn3270 servers in the network, the product uses SNMP tools.

Once in place, SNA View 2.0 has search tools that can locate client session paths based on factors such as SNA physical unit or logical unit names. It can also locate the LAN Media Access Control and IP addresses. From there, users can pinpoint problems, such as session outages.

SNA View 2.0 data can also be for-

See Cisco, page 26

More Online

- SNA View 2.0 release notes.
- A look at changes in Cisco's InterWorks business unit.

PROD ID: 2632 ON FUSION

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VA Research steps up Linux campaign

Company makes two acquisitions, changes name.

BY ROBIN SCHREIER HOHMAN

Mountain View, Calif. — VA Research is buying two other Linux companies to further its mission of bringing the open source operating system to enterprise networks.

VA Research is further emphasizing its focus on Linux by changing the company's name to VA Linux Systems. In addition, the company is setting up a research lab to help develop the Linux kernel and port applications to the operating system.

but the real motivation is to gain employees who know Linux and the Linux community.

"When you find them you've got to grab them because it's a lot harder to grow them," says VA CEO Larry Augustin, who co-founded the company in 1993 while he was a graduate student at Stanford University.

Last month, the company bought Electric Lichen, a marketing and consulting firm with offices in New York and San Francisco. The New York offices became the VA sales and support center.

PROFILE: VA LINUX SYSTEMS (FORMERLY VA RESEARCH)

Headquarters:	Mountain View, Calif.
Founded:	1993
Primary business:	Workstations and servers optimized for Linux
Management:	Larry Augustin, co-founder, president and CEO; Leonard Zupilloff, chief technology officer; board of directors includes Carl Reedfield of Cisco and Jeff Allen of Network Appliance
Employees:	108
Fun fact:	Augustin founded the company while he was a graduate student at Stanford University.

The lab will work on making Linux more scalable by porting it to Intel's new 64-bit processor architecture, as well as to new eight-way processor-based machines and larger RAID arrays.

Acquisition spree

The company is buying Enlightenment Solutions, a Linux marketing and services company, that co-developed a Linux desktop manager that is used in Red Hat Linux 6.0, as well as a configuration tool for the Apache Web server.

VA is also buying Linux Hardware Solutions, which sells Linux computers similar to those sold by VA.

VA declined to say how much it is paying for either company.

Under the transactions, the company acquires some assets,

VA has more than tripled its number of employees this year, starting with less than 30 employees in January and reporting 108 now.

The company continues to grow and has a number of job openings.

In March, Intel bought a stake in the company but refused to disclose the amount paid. In September, Sequoia Capital invested in VA, as well.

Augustin declined to comment on VA's revenue but says most of the company's sales are to enterprise customers.

In 1998, revenue generated by the sale of Linux software worldwide totaled \$38 million, according to Dan Kusnetzky, an analyst at International Data Corp. (IDC), a Framingham, Mass., market research firm.

IDC does not currently track Linux hardware sales. ☐

FORE's Hydra switch leaves the drawing board

BY JEFF CARUSO

PITTSBURGH — FORE Systems last week began shipping the first manifestation of its hybrid ATM-Ethernet switch, code-named Hydra.

The switch, the ESX-3000, has eight slots that users can fill with ATM or Ethernet cards. The switch can hold up to 128 ports of OC-3 (155M bit/sec) ATM or 32 ports of OC-12 (622M bit/sec) ATM. Ethernet cards will ship in the third quarter and will provide up to 192 ports of 10/100M bit/sec Ethernet in the switch.

The ESX-3000 comes with a 10G bit/sec or 20G bit/sec backplane and is ready for OC-48 (2.5G bit/sec) ATM connections, FORE says.

The product can maintain high speeds because it puts



FORE's ESX-3000 can be packed with ATM and Ethernet ports.

the segmentation and reassembly (SAR) function in the hardware, according to FORE. The SAR chips translate Ethernet frames into ATM cells and back again. Each card has its own SAR chips.

FORE also introduced a soft-

ware agent for its ESX line of switches that is intended to optimize the passing of SAP R/3 traffic through the switch. The agent, called ERP Express, ensures that traffic associated with enterprise resource planning gets through in a timely manner.

FORE will introduce similar agents in the future for other types of traffic, such as voice that uses the ITU H.323 standard.

The ESX-3000 is available now with ATM ports and starts at about \$21,000 for the 20G bit/sec version.

The ERP Express will ship in the third quarter for the ESX-2400 and ESX-4800, and will cost roughly \$11,000. A future release will be designed for the ESX-3000.

FORE: (888) 404-0444

Big Iron gets big performance bump

BY JEANETTE BORZO

IBM's new mainframe line — the S/390 Parallel Enterprise Server Generation 6 (G6) — is aimed at customers who need to handle high-volume electronic commerce transactions.

The G6 also offers options to support Fibre Connection (FICON), Gigabit Ethernet networks and Parallel Sysplex clustering. FICON is IBM's latest high-performance I/O interface for Big Iron.

Earlier this year, IBM upgraded the S/390's operating

system software — OS/390 — offering enhancements in network support, security and systems management.

The hardware upgrade coupled with the operating system upgrade is meant to increase the viability of S/390 mainframes for e-commerce, online retailers and Web brokerages by positioning the mainframe as a better option than high-end Unix servers, IBM says.

The microprocessors in the largest G6 system run at 637 MHz so the system can deliver more than 1,600 MIPS. This advance represents a

more than 50% increase in MIPS over the G5 mainframe, IBM claims.

The S/390 G6, due to ship May 28, is the company's first mainframe or enterprise server to use Big Blue's copper chip technology. The new chips increase speed and capacity, cost less and use less electricity than existing aluminum chips. G6 pricing was not available.

For more information, contact IBM at (914) 765-1900.

Borzo is a correspondent with the *IDG News Service's Paris bureau*.

Adtran, continued from page 21

Adtran's Safe-T-Net also allows the Atlas 800 to back up different frame relay intranets within an enterprise.

For example, if an engineering group within a corporation has a separate network from the sales force, the Atlas 800 can back up both groups and keep traffic from the two networks separate.

The backup system handles data and voice over frame relay.

The Safe-T-Net software is free but requires ISDN hardware modules costing about \$2,300.

Still selling to carriers

In addition to re-energizing its enterprise network efforts, Adtran is changing the name of its telco division to Carrier Networks Division.

The new name is part of Adtran's plan to emphasize the company's gear for upstream carriers and ISPs as well as for traditional phone companies.

The first new product out of this renamed division is the Total Access 750, a T1 access device that would sit at a customer site but would probably be sold and managed by a carrier.

Customers will be able to directly tie their LANs, PBXs and video gear into the access device, potentially eliminating the need for separate T-1s for voice and data.

Total Access 750 costs \$2,545 and will be available next month.

Adtran: (800) 923-8726

ArrowPoint to give Web switch Gigabit Ethernet boost

BY ROBIN SCHREIER HOHMAN

LAS VEGAS — ArrowPoint this week will unveil the first Giga-

bit Ethernet modules for its high-end Web switch, enabling intelligent load balancing for very large enterprise server farms.

The two- and four-port modules will be available for the chassis-based CS-800 Content Smart Web switches. The modules will ship with snap-

Gigabit Interface Converters (GBICs), which provide the interface for multimode fiber Gigabit Ethernet connections. GBICs allow users to change the blade interface themselves.

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Separately, ArrowPoint last week announced Smart Content Replication software that will enable the switches to pinpoint the cause of spikes in Web traffic.

If there is a big increase in Web traffic, the switch determines what page or pages are causing the increase, replicates the data and puts it on another data store, such as a Web cache or Web server.

The CS-800 can process 20,000 HTTP flow setups per second by using distributed processors rather than a central processor to handle traffic.



New ArrowPoint software enables the company's switches to get to the bottom of traffic spikes.

One analyst says ArrowPoint's new software may appeal to many ISPs.

"It gives the ISPs a service they can turn around and resell, which is what they're looking for," says Stan Schatt, an analyst at Giga Information Group.

The software will enable ISPs to sell service guarantees — which are pure profit for them — in the same way that the telephone companies can sell call-waiting or call-forwarding services.

The two-port module for multimode fiber will sell for \$7,000, and the four-port module for multimode fiber will cost \$8,000.

ArrowPoint expects to ship the blades in 60 days.

The Smart Content Replication software will be available in July and is priced at roughly \$20,000 for the CS-800 and \$8,000 for the lower-end CS-100 switch.

ArrowPoint: (978) 692-5875

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Gadzoox adds spice to shared storage nets

Capelix switch expands from six to 34 ports.

BY DENI CONNOR

SAN JOSE — Gadzoox Networks is readying a modular Fibre Channel device that lets companies extend the benefits of switch-based storage networks to those anchored by shared hubs.

The company's new Capelix device enables switch capabilities such as zoning, which involves the authentication

fiber-optic cabling, or a combination of the two. Capelix employs a 28G bit/sec switched backplane and will gain ATM support in the future.

Modules can be swapped in and out while the switch is running. Capelix also features dual fans and power supplies for fault tolerance.

Capelix fits in a standard rack-mount enclosure, and in its most complete configuration, the switch is only 8 inches high.

Customers can manage the switch using embedded software called Reflex II, which monitors, detects and isolates disruptive network events caused by power fluctuations, rebooting or intermittent port failure.

Additionally, users can manage the switch's configuration via Gadzoox's Veritas SAN Manager software. Out-of-band management can be used if the network is down.

Gadzoox owns about two-thirds of the Fibre Channel hub and switch market based on revenue, according to International Data Corp. (IDC), a Framingham, Mass., market research firm. The market is growing steadily and could reach \$1.5 billion by 2003, says Robert Gray, an IDC analyst who is impressed with Capelix's flexible architecture.

Gadzoox shipped its first product, an unmanaged Fibre Channel hub, three years ago and followed it with a managed hub and storage management software one year later. Last year, the company introduced its first switch.

The new switch will be available in the third quarter with pricing starting at less than \$10,000.

Gadzoox: (408) 360-7360



Gadzoox's Capelix switch can be used to off-load backup work from servers.

of servers to individual storage devices and the ability of servers to share different parts of a disk at the same time.

The chassis-based switch sits between a Fibre Channel arbitrated loop storage network and one based on a switched-fabric device from the likes of Brocade Communications or Ancor. Plunking the switch into such a network does not require the customer to swap out host bus adapters, RAID controllers or drivers.

Capelix can be used to off-load data backup tasks from servers. The server simply needs to hand the data off to the switch, which will cache it and transfer the data to storage devices. Capelix can also handle the mirroring of data between storage devices.

The switch can be expanded from six to 34 ports based on coaxial or

Cisco,
continued from page 21

warded to IBM's NetView for OS/390 or Cisco's CiscoWorks Blue management suite. Users can utilize these platforms to issue trouble tickets or initiate automated problem responses.

One beta tester, who works for a large service provider that has thousands of SNA terminals and a large IP backbone, gave SNA View 2.0 the thumbs up.

The IS manager, who spoke on condi-

tions of anonymity, says his net needed a tool that could track SNA data running over a DLISW backbone. Given the size and heterogeneity of his enterprise, he says it can be "nightmarish" to correlate session data. Investigating a failure among his SNA and DLISW nets was a slow, painstaking task. SNA View 2.0 reduced problem resolution time from 20 minutes to 2 minutes. "We were very impressed," he says.

SNA View 2.0 is available now. Pricing for the software starts at \$5,000.

Cisco: (800) 553-6387

What do the leading network security companies all agree on?

OPSEC



Authentication

ActiveCard Token
AXENT Defender Security Server
BackGate Enterprise Security Server
CRYPTOCARD CRYPTOserver
Funk Software Steel-Belted Radius
LexiMeh DataCom FireNet 8000
Netegrity SiteMinder
Secure Computing SafeWord
Security Dynamics ACE/Server
Vasco Corporation VACMan

Content Security

Aleaddin Knowledge Systems eSafe Protect Gateway
Altrio PriviWall
Comnet Technologies MIMEenalyzer for FireWall-1
Log On Data X-STOP for FireWall-1
NetPartners WebSense for FireWall-1
Secure Computing Smart Filter
Security-7 Software SafeGate
SurfWatch Software SurfWatch for FireWall-1
Symantec Norton AntiVirus for Firewalls
Trend Micro Internet Scan VirusWall
URLabs Inc. I-Gear

Directory Management

IBM eCommerce Directory Server
Netscape Directory Server

Event Analysis And Reporting

Microscan NetScoutFireWall-1
SecureIT Firewall HealthCHECK
SecureIT SecureVIEW
TeleMatrix Software TELEMATe.Net
WebTrends WebTrends for Firewalls and VPNs

High Availability

Legato Systems FullTimeHA+
Miracron Endurance 4000
Nokia IP Series Router/Firewall
RADWARE RADWARE FireProof
RSI Solutions RSE-1
Storatrix Corporation StoneBeat
Veritas Software FastWatch

Intrusion Detection

Check Point RealSecure
ISS RealSecure
Memecore SECURED for FireWall-1

Other Technology

Chrysalis-ITS Check Point Accelerator Card
RSA BSAFE SSL-C

Security Managed Applications

BackWeb Technologies BackWeb Channel Server
Campbell Services OnTime Enterprise NT
Claris WinFrame
e-motion Creative Partner
FreeTel Communications FreeTel Personal Edition
Microsoft NetMeeting
Netscape Communications CoolTalk
Netscape Communications Communicator
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FlowWise enhances router acceleration

BY JIM DUFFY

SAN JOSE — FlowWise has unveiled

software for its router accelerators that enables users to stack the products and support more LAN segments.

Router accelerators are hardware devices that increase the performance of IP router networks with minimal recon-

figuration. The accelerators assume some of the Layer 3 functions of routers without the network reconfiguration hassles of Layer 3 switches, FlowWise claims. Users need only 10 minutes to configure router accelerators, and they do not have to reconfigure router ports, the company says.

The new software packages for FlowWise's IMS router accelerators are called AutoPort and CatStak. AutoPort enables the router accelerators to support more ports and LAN segments without adding ports to the router.

Currently, users have to dedicate two IMS router accelerator ports when connecting workgroup or server farm switches to a router. That means a 16-port IMS 1600 router accelerator could attach up to eight LAN segments or IP subnets to a router.

AutoPort enables users to dedicate only one IMS 1600 port to the router while the other 15 can be used to attach downstream LAN switches. This almost



FlowWise's 1600 router accelerator will be more powerful with new software.

doubles the number of LAN segments or IP subnets a 16-port IMS can support.

"One of the things I'm dealing with is smaller IP subnets," says FlowWise user Ben Beasley, a network consultant in the payment services division at the state of California's Department of Health Services. "Users are having a tough time when they get over three or four subnets per Ethernet port on the router. AutoPort will allow us to manage all subnets and let the router do what it does best."

CatStak software lets users support even more segments and subnets in an IMS environment. The software provides the glue needed to stack up to 64 router accelerators through a Cisco Catalyst LAN switch. Cisco's EtherChannel technology, which aggregates Ethernet links into fatter pipes, can be used to provide fault-tolerant links between router accelerators in a stack.

A 64-accelerator stack would add up to nearly 900 wire-speed Layer 3 Fast Ethernet ports. This configuration would deliver 192G bit/sec of bandwidth and 130 million packet/sec of throughput, which FlowWise says is more than 100 times the performance of a Catalyst LAN switch with a Cisco NetFlow Feature Card. A NetFlow Feature Card adds Layer 3 switching to a Catalyst LAN switch.

With CatStak software, users can also bypass the router and switch reconfiguration required by the NetFlow Feature Card, FlowWise says.

CatStak and AutoPort cost \$2,000 as a bundled package. The software will be available this summer.

FlowWise: (408) 474-0385

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Xylan switches gain policy features

BY JEFF CARUSO

CALABASAS, CALIF. — Xylan last

week announced it has embedded policy software — including a policy server, an authentication service, IP

address management software and directory services — into its switches. The move is the latest in a series of

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policy-related product announcements from key network players, also including Extreme Networks, IBM and Lucent. Policy-based networking is the ability to grant users varying levels of access to network resources, such as servers and network bandwidth.

"Making network devices more intelligent is the way to go," says Mike McConnell, a director at Infonetix Research in San Jose. Unfortunately, most vendors, including Xylan, are implementing policy-based networking for their own devices, rather than creating policies that interoperate.

Network administrators can now use a policy server from Xylan to give traffic associated with certain applications or servers various levels of priority and bandwidth through Xylan switches.

The company's new authentication service requires users to log on to the network. The software accesses security



Users can now set policies to manage Xylan switches.

databases using either Remote Authentication Dial-In User Service or Lightweight Directory Access Protocol (LDAP) to verify that the users are allowed access to resources.

For directory services, Xylan switches use an LDAP client to access a directory server. This way, the switches know what policies to assign to users listed in the directory.

For IP address management, Xylan uses the Dynamic Host Configuration Protocol and Domain Name Service software from Lucent's Quadtrick division. As users log on to the net, the IP Control software assigns them temporary IP addresses. This allows more flexibility for moving users around the network.

Xylan is also shipping a Java-based management application, called QoS PolicyView, which helps network managers build policies and set them on Xylan switches.

The policy server and the authentication service have the same price: \$2,000 for Xylan's chassis-based switches, and \$1,000 for its stackable switches. QoS PolicyView costs roughly \$20,000. The LDAP client is free with Xylan switches. IP Control costs about \$500.

Xylan: (818) 880-3500



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Integrators unite to ease thin-client projects

Companies say they offer the thin-client expertise that larger integrators, such as EDS and KPMG, lack.

BY JOHN COX

Ten systems integrators have banded together to speed thin-client deployments for large customers.

Members of the new Thin Client Organization (TCO) will work together to install and support Windows-based thin-client networks, especially those that extend across widely separated geographical areas.

"The primary purpose is to let the best thin-client integrators address enterprise customers' needs for national deployments," says William Botti, president of Computer Networks, a Pleasanton, Calif., integrator and charter member of the TCO.

It's no accident that the group goes by the acronym "TCO," which also represents the term "total cost of ownership." Part of the appeal of thin-client

technology is that it can reduce costs by moving applications to central servers and replacing full-blown PCs with inexpensive desktop terminals.

TCO members focus on building networks anchored by multitier Windows NT servers running Citrix Systems' WinFrame or Windows NT 4.0 Server Terminal Server Edition.

Getting down to business

Here's how TCO will operate: A customer that is based in California but has sites across the U.S. could approach Computer Networks to build a thin-client architecture. Computer Networks would then serve as the project manager and

Thin Client Organization (TCO)

Mission:

To coordinate nationwide service and support for large thin-client customers and share among group members information and experience about technology, operations and marketing.

Charter members:

Async Technologies, Michigan; Computer Networks and Micro Visions, California; InfoLAN, Missouri; LanTech, Indiana; Moose Logic, Washington; Omnitach Corporate Solutions, New Jersey; Syntax, Minnesota; Vector Technology, Texas; Vertical Software, Maryland

All members are Citrix resellers and Microsoft Solutions Providers.

subcontract with other TCO members to handle deployment and support in their respective geographic regions.

"With the TCO, I can put 50 engineers on the street [for a customer deployment] in a week," Botti says. "I couldn't do that with just my own company's resources."

Such thin-client setups require a different way of thinking about corporate networks. Customers must license software differently, some applications have to be tweaked, and

LAN and WAN bandwidth may need to be increased.

In the past, customers have often turned to the biggest integrators, such as EDS or KPMG, for help with such projects.

But these companies typically lack thin-client expertise, Botti says, and often subcontract such projects to companies like his own.

The TCO plans to partner with larger integrators to make such subcontracting easier.

The 10 charter TCO members claim to have a total of 2,900 customer deployments and an estimated 740,000 thin-client users.

The TCO is encouraging other integrators to join the group and plans to set up an evaluation process for new thin-client products and technologies. Those passing muster will be certified by the TCO.

For more information on the group, go to www.thinclientorg.com. ■

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Policy routers police net access, security

Internet Devices eases remote access mgmt., adds IP Security.

BY TIM GREENE

SUNNYVALE, CALIF. — Internet Devices has four new routers that enable network executives to control access to enterprise resources based on user profiles.

Fort Knox Policy Router CE routers can be used to control network access based on time of day, as well as by limiting certain users to specific applications and subnets.

The routers allow or deny access after checking a policy server also available from Internet Devices. Management software enables different levels of IT managers to set policies for the end users or departments they oversee.

In addition to enforcing policies, the policy routers can encrypt traffic between sites using IP Security technology.

The Fort Knox gear stands apart from other policy routers because of its focus on security, says Dave Koslur, an analyst with the Burton Group in Midvale, Utah. Products from compet-

ing vendors, such as Cisco and Nortel Networks, are more focused on quality of service, he says.

Koslur also says Internet Devices' software for managing user access offers features that other products lack, such as a simple way to grant groups of users a single set of access rights even if the users are located at many different sites on a network.

The smallest of the routers has two 10/100M bit/sec Ethernet ports, one to connect to the LAN and one to connect to the WAN router.

The three other routers have three ports each; the third port connects to devices in a demilitarized zone between firewalls. The Internet Devices routers also vary in processing power.

The routers range in price from about \$2,000 to \$18,000. The policy server comes in two models that cost \$15,000 and \$25,000. The policy management software costs \$400 to \$1,000 depending on the number of routers being managed.

Internet Devices: (408) 541-1400

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HUNTING FOR DIRECTORY APPS

A larger-than-usual number of you will be reading this on an airplane, winging your way toward Las Vegas for NetWorld+Interop 99.

This could be a very exciting show, especially for those of us who have been hunting high and low for applications that effectively leverage direc-

tory services.

The big hardware folks have already weighed in with their offerings as have the directory management vendors. Now it's time for other software houses to directory-enable their products.

As just one example, venerable speech processing company Dragon

Systems has announced (and is just about ready to ship) a directory-enabled version of its flagship Dragon NaturallySpeaking software. This speech recognition software has been used for years to improve productivity and speed in a variety of applications, including e-mail packages, forms entry and natural language search programs, medical and legal record systems, and corporate groupware applications.

The new directory-enabled Dragon NaturallySpeaking Enterprise software lets a network administrator install and manage Dragon NaturallySpeaking software from a central location. You can use the new Administrator Workbench to create and delete users, and update vocabularies and speech commands. NaturallySpeaking Enterprise requires a network that provides directory service to Windows clients, including Windows 2000 (with Active Directory) and NetWare (with Novell Directory Services).

Speech files and speech commands are stored on the server. Users can log on from any PC on the network and use or modify their speech files and commands. Portable PC users can copy their speech files to their local drives, alter the files while disconnected from the network and then resynchronize when reconnected to the network.

Applications such as NaturallySpeaking Enterprise can help you sell the benefits of the directory to the skeptics in your enterprise. These are the products that make digital identity a reality — no matter where you are, anywhere on the network or even remotely connected — the applications look and feel the same while optimizing themselves for your location and the client hardware you're using.

Kearns, a former network administrator, is a freelance writer and consultant in Austin, Texas. He can be reached at wired@rqutil.com.

Dave Kearns' column was omitted two weeks ago due to a printer's error. Kearns' column runs every two weeks.

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Gigabit Ethernet ventures into the land beyond the LAN

BY JEFF CARUSO

Users are starting to get into Gigabit Ethernet for the long haul — literally.

As Gigabit Ethernet picks up momentum in enterprise LANs, it is also extending to metropolitan-area networks (MAN), connecting buildings or campuses scattered throughout a city. Enterprise users cite the technology's low cost and familiarity as primary reasons for implementing Gigabit Ethernet across MANs and even WANs.

The Gigabit Ethernet specification allows the technology to stretch 5 kilometers from one switch to another, though sources say standard Gigabit Ethernet can actually reach about 10 kilometers with more powerful optics than those specified in the standard. With proprietary hardware and high-quality fiber-optic lines, some vendors claim to extend the technology's reach up to 70 kilometers and farther.

As early work on a 10-Gigabit Ethernet standard gets underway, vendors are pushing for the standard to include specifications supporting MAN and WAN links. At the IEEE's call for interest on 10-Gigabit Ethernet in March, vendors acknowledged the need for the technology in LAN backbones but indicated that it also has to have a future over long distances.

In the meantime, companies lucky enough to have access to dark fiber — that is, fiber-optic lines that have been installed but are not carrying signals — can run Gigabit Ethernet between sites as a backbone network technology. One example is Harris Corp., which wanted to connect its Electronic Systems Sector (ESS) business with the main headquarters across town in Melbourne, Fla. The 5,000 users at ESS would run financial, e-mail and Internet applications over the link to headquarters.

Though Harris' bandwidth requirements weren't high, the low price of Gigabit Ethernet gear was compelling. "It was \$35,000 for the whole thing," says Mike Oyler, systems engineer at ESS, which settled on equipment from Foundry Networks. He adds that Fast Ethernet probably would have been even less expensive, but he wanted to ensure the network wouldn't have to be upgraded for a long time. "Why worry about the future?" he says.

Without Gigabit Ethernet services from carriers, users will have to find dark fiber. Carriers usually resell dark fiber, but unfortunately, dark fiber is not available everywhere.

"We can't get dark fiber from here to our new facility, which is 10 miles away," says Marsha Klapperman, senior network engineer at Network Appliance in Redwood City, Calif. The company wants to connect the buildings primarily to conduct file transfers using Network Appliance's network

HIGH-SPEED TECHNOLOGY

Gigabit Ethernet is seen as an alternative to FDDI and ATM in some MAN and WAN environments.

Going the distance

The distance Gigabit Ethernet can reach varies widely, depending on the medium over which it travels. Sources say Gigabit Ethernet can reach these distances:

Medium	Standard	Reach
C coaxial cable	100Base CX	25 meters
Cateren5 UTP copper cable	100Base T	100 meters
Multimode fiber	100Base SX	1 kilometer
Single mode fiber	100Base LX	10 kilometers
Single mode fiber	Proprietary	Up to 70 kilometers

storage devices.

Instead of utilizing a gigabit per second, Network Appliance will have to throttle down its connection to OC-3 (155M bit/sec) or DS-3 (45M bit/sec) over the 10-mile span, Klapperman says.

Carriers, however, are also looking into Gigabit Ethernet for offering services over long distances (NW April 12, page 1). Companies that are interested include Ameritech, Bell Atlantic, BellSouth and SBC Communications.

Gigabit Ethernet and ATM

Gigabit Ethernet joins other network technologies still widely used in the MAN, such as FDDI and ATM. Gigabit Ethernet owes its popularity to the market dominance of its fellow Ethernet technologies. Because vendors sell much more Ethernet and Fast Ethernet equipment than token-ring or FDDI gear, Gigabit Ethernet is becoming popular because it is a similar technology. Because so many vendors are making Gigabit Ethernet equipment, competition is pushing down prices. These factors also apply in the MAN, so Gigabit Ethernet's popularity is spilling over into MAN environments.

To its disadvantage, Gigabit Ethernet doesn't have the resilience of other technologies used in this area.

It's not a terribly fault-tolerant technology," says Mary Petrosky, an independent technology analyst in

San Mateo, Calif. ATM was built to travel over long distances and withstand adverse conditions. ATM was also built to carry real-time traffic, such as voice and video.

Time-critical applications really require ATM, says Tim Price, an assistant network administrator at the U.S. Army's Redstone Arsenal in Huntsville, Ala. Redstone conducts weapons tests with pieces of equipment in different locations. To stay synchronized, the equipment uses ATM. Price says.

However, the arsenal uses Gigabit Ethernet over long distances. The installation is spread out over 10 kilometers, and Gigabit Ethernet carries the installation's more conventional LAN applications, such as e-mail. "We couldn't run ATM to everything," Price says. "It's just too expensive."

Others rely on Gigabit Ethernet, even for supporting video traffic. The MAN connecting educational institutions in Spokane, Wash., runs video over Gigabit Ethernet by applying quality-of-service controls to the traffic (NW July 20, 1998, page 60). Because video is given a higher priority than other traffic, it's guaranteed to get through when the links are overloaded.

One big cost associated with Gigabit Ethernet over a MAN is in the fiber itself. The Spokane schools, for instance, spent four times as much on laying dark fiber than they did on Gigabit Ethernet equipment from Packet Engines. While pricing for Gigabit Ethernet services hasn't been set, current transparent LAN services cost anywhere from \$750 to \$2,000 per month.

For the most part, the factors in deciding between using Gigabit Ethernet or ATM in the MAN are the same as the factors in deciding whether to use one transmission technology or the other in LAN backbones. Users who care more about costs will often choose Gigabit Ethernet, and those who care more about real-time traffic will often choose ATM.

So many choices

It is still undetermined which technology will prove more popular with users. Service providers are getting hit with many options when it comes to transporting data over the MAN and WAN, Petrosky says. In addition to Gigabit Ethernet and ATM, service providers can choose IP over SONET or Multi-protocol Label Switching. Transparent LAN services providing Ethernet, Fast Ethernet and FDDI in MANs are also available.

Gigabit Ethernet is very much the newcomer to this environment. Most early enterprise adopters started testing Gigabit Ethernet gear in 1997, with implementations ramping up last year (NW July 20, 1998, page 1).

"I have a feeling we're going to see some experimentation with Gigabit Ethernet," Petrosky says. "People will play with this and see what will fly."



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Briefs

Qwest last week named Atsini Mohebbi as president and chief operating officer. Mohebbi is British Telecommunications' president and managing director for United Kingdom markets. He will start at Qwest June 1. At that time, Qwest Chairman and CEO Joseph Nacchio will be freed to spend more time focusing on overall corporate performance, long-term strategy, technology and corporate development. Qwest says Mohebbi will manage Qwest operations, including competitive business units, network engineering, and operations and information technology.

The California Public Utilities Commission has decided to ask the Federal Communications Commission for permission to implement "service-specific overlay area codes" — such as one for cellular and personal communications services numbers — which would serve the same geographic areas as existing area codes for landline numbers.

States must get federal waivers because the FCC banned service-specific area codes several years ago. The California commission is making its request because of a possible shortage of numbers in 20 of the state's 24 current area codes (NW, April 19, page 8).

MCI WorldCom and Sprint have expanded their international ATM services. For its major European markets, MCI WorldCom launched ATM Plus, a service under which the carrier manages the customer premises equipment.

Sprint's international venture, Global One, expanded its Global ATM service to 40 countries.

In addition to numerous European and Asian markets, the service is now available in Brazil, Chile, Colombia, Venezuela and Mexico.

RBOC termination penalties challenged

CLECs claim incumbent carriers effectively bar competition by locking users into long-term deals.

BY DAVID ROHDE

WASHINGTON, D.C. — Users who'd like to change local service providers before their current contracts expire may get a break as a result of a growing movement to throw out dominant local carriers' termination penalties.

Sparked by a little-known competitive local exchange carrier (CLEC) — KMC Telecom in Bedminster, N.J. — the movement's goal is to get state regulators to alter or ban the heavy financial penalties that regional Bell operating companies often charge users if they leave before their multiyear contracts are up.

Last month, KMC filed a petition with the Federal Communications Commission to ban RBOC termination penalties nationally and establish a period wherein users could move penalty-free to alternative carriers.

But the idea faces an uphill battle. So

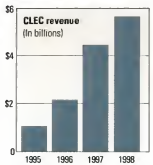
far, only one state, Ohio, is known to have granted even a temporary period during which users could escape RBOC termination penalties to move to a CLEC. And the CLECs' natural allies in regulatory battles — long-distance carriers who are also invading the local market — could be less inclined to fight. The reason: They use exactly the same type of termination penalties for their long-distance user contracts.

KMC has built fiber rings in 23 so-called "third-tier" cities — those with populations of less than 750,000. Mike Duke, the carrier's director of regulatory affairs, says because KMC is often the first CLEC available in these towns, many of the best customers have already signed long-term contracts with the dominant carrier to get a price break. When those users try to get out of the contract, the dominant carrier says they must pay 50% to 100% of the

See KMC, page 42

Barrier to market entry?

Some competitive local exchange carriers are finding ways to garner revenue despite incumbent carriers' termination clauses.



SOURCE: NEW PARADIGM RESOURCES GROUP, CHICAGO

Iridium woes cast a shadow over satellite services

BY DAVID ROHDE

WASHINGTON, D.C. — Emerging global satellite voice and data providers last week were scrambling to distance themselves from market pioneer Iridium World Communications, after Iridium reported disastrous financial results and endured predictions of its eventual demise.

Iridium, a constellation of 66 satellites that provides global calling and paging using a single handset, announced a first-quarter loss of \$505 million on revenue of just \$1,451,400. Even more ominous, the company said it had signed up 10,294 customers, a far cry from the 100,000 customers Iridium had promised lenders and investors it would have by now, and light-years from the 500,000 to 600,000 the company admits it needs to break even.

Iridium's results — closely accompanied by the recent resignation of its CEO and chief financial officer and a class-action shareholder lawsuit — called into question the whole market for low-earth orbit (LEO) satellite systems. Under these systems, providers launch groups of satellites into orbit 500 to 1,500 miles above ground level, and the satellites

hand off voice and data traffic to one another until one of the satellites sees the terminating party below.

Experts say Iridium has made two big mistakes. First, the company's service is costly — the handset cost around \$3,000 and airtime is \$3 to \$7 per minute. Iridium marketing officials have tried to position the service to compete

with expensive international toll calls, but analysts say users continue to view it as an alternative to cellular or personal communications services (PCS). "Despite Iridium's numerous protections to the contrary, its service does in fact compete with the services offered by terrestrial wireless networks," says a report by Current Analysis, an online service in Sterling, Va.

Second, Iridium has admitted that many of its distributors have been unable to gear up to sell the service.

Iridium's troubles provide an opening for LEO competitor Globalstar.

Globalstar — which will begin service by September after 32 of its planned 48 satellites are launched and tested — uses a handset that first attempts to complete a call using ordinary cellular or PCS, explains spokesman Mark Jeffery. It then rolls over to the satellite network if the party can't be reached.

Because Globalstar will be sold by experienced wireless providers, such as AirTouch and Vodafone, who also hold equity stakes in the venture, the service should be marketed effectively, Jeffery says. Globalstar is expected to carry a

See Iridium, page 42

No customers, no revenue

Iridium's failure to convince many people to use its ultrahexpensive calling service is taking its toll in red ink.



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Networks of Steel.

KMC, continued from page 39

contracted service for the remaining months.

"We face this in every market we go into," Duke says. This especially occurs when users buy ISDN, SONET or Centrex services, and in almost all ISP contracts.

One potential KMC customer, Network Tallahassee, the largest independent ISP in Florida's state capital, testified in March before the Florida Public Service Commission that Sprint's early termination penalties were forcing the company to stay put. Sprint is the dominant local carrier in Tallahassee.

"We pay Sprint about half a million dollars per year," says Ed Perrine, Network Tallahassee's chief operating officer. After one year of a three-year contract, Sprint requires a kill fee of half the remaining term of the contract.

Network Tallahassee wanted the option to switch simply because the company wanted to tell customers that it uses two different carriers' SONET rings. "I didn't go shopping because we were unhappy with our current service provider," Perrine says. "I went shopping seeking redundancy."

The Florida commission is considering the matter, but only one of the five commissioners backs the principle of allowing firms the option of switching local service providers.

One of the others is opposed. "He felt very strongly that a contract is a contract and the state has no business going in and messing with it afterward," Perrine says.

A similar debate took place in Ohio in 1997. There, the state commission granted a six-month period called "Fresh Look," during which customers in some cities could move to CLECs without penalty. Roughly 200 users reportedly contacted Ameritech about

moving during the period, says an Ameritech spokesman.

"We oppose regulators interfering with negotiated contracts," the spokesman says. "That's what we believe they were doing with Fresh Look." Fresh Look is no longer available in Ohio. It has been considered or

requested by CLECs in Indiana, Michigan and Wisconsin. Louisiana and North Carolina have rejected the idea after similar petitions, while Alabama and Kansas have opened proceedings on the matter.

Dominant carriers could solve the problem by changing the penalties to

something less onerous, Duke says. For example: If a user leaves a three-year contract after one year, the payments already made could be adjusted upward to the lesser discount level usually available on shorter contracts, but the user would not have to pay for future usage. ■

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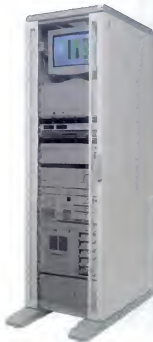
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Iridium, continued from page 39

retail airtime rate of 85 cents to \$1.25 per minute because of a simpler satellite design.

Many users will probably pass on these offers and wait for the arrival of Teledesic, a 288-satellite network that will focus on broadband Internet access rather than phone calls. A Teledesic spokesman rejects any connection between his project — originally backed by Bill Gates and Craig McCaw — and Iridium's woes.

"Teledesic's broadband service is the satellite equivalent of fiber-optic access, while Iridium is a narrowband voice service comparable to terrestrial cellular service," the spokesman says. Still, Teledesic has yet to launch any satellites and is not expected to be operational until 2003. ■



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FrameWatch keeps GTE honest

BY TIM GREENE

IRVING, TEXAS — GTE Network

Services is offering a new frame relay monitoring package that lets customers keep an eye on the service

provider's service-level promises.

GTE's FrameWatch service uses monitoring probes at each custo-

mer site to determine availability, delay and usage of virtual circuits between sites.

GTE presents this data to customers on a Web site that can be accessed via a browser. Customer reports are protected from prying eyes by digital certificates issued by GTE. The reports are updated twice per day with data that is collected every five minutes, GTE says.

That is an improvement over the standard GTE method of delivering performance reports — monthly and on paper — says Michael Pollard, WAN administrator for Hillsborough County, Fla. She says the county's Information and Technologies Services Department now

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■ **"FrameWatch can provide a point of reference for provisioning future circuits."**

Michael Pollard, WAN manager, Hillsborough County, Fla.

uses a managed GTE frame relay service. She is familiar with FrameWatch, but the county does not use it yet.

In addition to keeping an eye on how well GTE is doing, such reports could help plan growth of the Hillsborough network, Pollard says. If traffic increases on a given circuit, the size of that circuit can be increased before it gets congested. Or the reports might show that some connections have too much bandwidth for the traffic they bear.

"FrameWatch could provide a point of reference for provisioning future circuits," Pollard says. "Maybe you'll find that 256K bit/sec is overkill for one circuit."

Customers could buy the frame relay probes themselves and install them at each frame relay network site, but the service eliminates the need for customers to buy a centralized management platform to monitor the probes. Instead, GTE installs the probes and maintains them as well as gathers data for the reports.

The FrameWatch service reports on faults found with frame relay connections and on data delivery rates above and below the minimums guaranteed in service agreements. GTE uses FrameWatch Service Level Verifier System probes made by Paradyne.

FrameWatch service costs \$60 per month, and the customer either buys or leases the probes. FrameWatch is available now.

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Savvis builds business ISP savvy

CEO Heintzelman reshapes company's services for the future.



Savvis Communications, a 4-year-old ISP, is trying to become a service provider for business users — until late last year, Savvis' only customers were other ISPs.

The company has added business services such as managed firewall and digital subscriber line (DSL)

Internet access, and shortly, will add a virtual private network (VPN) offering. The shift to a business-oriented service company was sparked by two events: a new parent company and a new CEO.

Privately held Bridge Information Systems acquired Savvis last month for an undisclosed figure. Little-known Bridge is a global service com-

pany that offers 280,000 customers detailed financial information. In December, 20-year communications industry veteran Clyde Heintzelman joined Savvis as CEO and president. Heintzelman spent the majority of his career at Bell Atlantic, but most recently was the chief operating officer and president at Digex, a national ISP owned by Intermedia

Communications.

Heintzelman recently talked with Network World Senior Editor Denise Pappalardo about the future of Savvis.

Why the shift from providing only wholesale ISP services to providing business services?

We have a lot of ISP customers on our network. My background [at Digex] has been in the business-focused ISP world, and that's a better place in terms of margins and quality of revenue. Savvis' executive staff has much success in providing premium business services, and that's what we're building here. And because [third-



party testing] rates Savvis' backbone as one of the best performing networks, it's easier to bring premium services to business customers.

Savvis has announced several new services.
See Savvis, page 46

IXCs turn to wireless for local service options

Sprint and MCI WorldCom spending more than \$1 billion to acquire wireless broadband companies.

BY DENISE PAPPALARDO

Sprint and MCI WorldCom are investing more than \$1 billion to acquire local wireless network providers that the carriers hope will boost their local and long-distance voice and data services.

Last week, Sprint announced plans to buy Videocon USA and Transworld Telecommunications, two wireless service providers, which means Sprint has spent some \$800 million to acquire four wireless companies since April. Sprint's two other acquisitions were People's Choice TV and American Telecasting.

MCI WorldCom last month also announced plans to ac-

quire MCI Wireless for \$350 million to \$400 million. MCI WorldCom has yet to reveal the exact purchase price.

These acquisitions are the most recent examples of how interexchange carriers (IXC) are paying big bucks to reach business users directly, rather than depending on incumbent local exchange carrier (ILEC) networks for that link.

Carriers often promise lower cost services when they bypass traditional local-loop access, but whether those savings get passed along remains to be seen.

As more carriers look for new ways to reach customers, business users can at least find more bundled local and long-distance voice, video and

data services that could simplify billing and possibly lower costs.

The benefits for Sprint and MCI: They avoid the political hurdles of dealing with the ILECs to reach their customers, and they get a network technology that arch rival AT&T and other competitors, such as Nextlink Communications, don't have.

Sprint and MCI WorldCom are tapping into a relatively new area for traditional telecommunications providers — Multipoint Multichannel Distribution Service (MMDs).

All five of the service providers that Sprint and MCI WorldCom are in the process of acquiring support

MMDs networks, which operate in the 2.5- to 2.7-GHz range. MMDs is fixed wireless technology like Local Multipoint Distribution Services, but MMDs is supporting traffic today where LMDs carriers haven't yet started constructing networks.

MMDs licenses were distributed by the Federal Communications Commission some 15 years ago with the idea that they would be used to offer asymmetric wireless cable television services. But that plan hasn't panned out.

Many of the service providers that have been acquired by Sprint and MCI WorldCom are not financially sound, hence they were looking to be bought. CAI Wireless, for instance, is just coming out of bankruptcy protection.

The FCC has authorized two-way traffic in the MMDs frequencies in a handful of cities. Approval for two-way MMDs communications in some 500 additional cities is expected later this year, says Robert Rini, managing attorney at Rini, Coran & Lancellotti, a communications law firm in Washington, D.C. that often works closely

with the FCC.

Sprint is aggressively going after MMDs providers to extend the reach of its Integrated On-demand Network (ION) service. ION is Sprint's service that carries everything from local and long-distance voice to Internet traffic.

Although local service is an integral part of ION, Sprint doesn't have much of a local presence to offer business users. Sprint's competitors, such as MCI WorldCom, have also acquired some competitive local exchange carriers (CLEC) to locally reach its business customers.

But MCI WorldCom's CLEC division still doesn't reach all of the IXC's customer base, which is why MCI WorldCom is acquiring CAI Wireless.

Not alone

Sprint and MCI WorldCom are not alone in their quest to bypass ILECs. Competitors such as AT&T and Nextlink have already made big moves in this area.

AT&T already has cable television provider Telecommunications, Inc. under its belt, which gives the company local access to millions of customers. And the telecommunications giant is also trying to buy MediaOne Group to further develop its local consumer strategy. To address business users, AT&T also has Teleport Communications Group, one of the largest CLECs in the country. ☐

Local-loop access options aren't cheap

Sprint and MCI WorldCom are aggressively going after fixed wireless cable television companies. While all these deals are pending, here's what's on the table today:

Acquirer	Acquiree	How much	Prime areas of coverage
Sprint	Transworld Telecommunications	\$30 million	Seattle; Columbus, Ohio
	Videocon USA	\$180 million	San Francisco; San Jose
	American Telecasting	\$448.8 million	Portland, Ore.; Denver; Las Vegas
	People's Choice TV	\$151 million	Phoenix; Detroit
MCI WorldCom	CAI Wireless	\$350 million to \$400 million	New York; Philadelphia; Norfolk, Va.

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Savvis,
continued from page 44

ity services. What else are you coming out with to nab business users? We plan on offering bundled services. Services that not only

include access routers and Border Gateway Protocol configurations, but also firewall servers, strong security and high-end routers.

That's why Savvis teamed with Northpoint to bundle DSL Internet access and [virtual private net-

work] services.

But Savvis doesn't have a VPN service yet. When should customers expect to hear more about that?

VPNs are right on the horizon, and we should have more information

within two months.

Many of your competitors already have VPN services. How will your service, coming late to market, differentiate itself?

We will offer users control over the quality of that VPN from end to end. We will also largely focus on specific markets, vertical markets such as finance. We'll control the quality by keeping the traffic all on our own ATM-based network.

Bridge acquired Savvis last month. How will this new parent benefit Savvis customers?

We can easily marry Bridge's and Savvis' networks because we both use Cascade ATM switches. And Bridge is heavily focused internationally, where our network operations are uniquely domestic.

When you mash those two networks together and bring Bridge's financial content and our distribution capabilities to the table you have a strong combination of assets. Bridge is a company with more than \$1 billion in revenue. As a result, there is more substance and financial strength by combining the two companies. We should also be able to lower our costs because we'll be able to buy fiber and equipment in larger quantities.

Prior to Savvis' business service push, the company was best known for building what Savvis calls Private Network Access Points (P-NAP). What advantage does this approach of exchanging Internet traffic give Savvis over competitors?

Most of our customers' traffic only makes one hop when traveling over Savvis' network. This allows our network to be rated lowest in latency. Our network design is unique because customers are never more than one or two hops away from their final destinations.

How do you engineer that?

Savvis peers with the three major national ISPs — UUNET, Cable & Wireless and Sprint — at each of its P-NAPs, in addition to peering with numerous smaller national ISPs. The big three ISPs reach more than 80% of all Web sites on the Internet.

How many P-NAPs are set up right now?

There are eight P-NAPs, and each has at least three DS-3 or three OC-3 connections to UUNET, Cable & Wireless and Sprint. We offer customers more access than they can get on their own because if they buy a T-1 from us, they get high-bandwidth access to three major providers and also some smaller ISPs. ■

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Wan Monitor . Daniel Briere and Christine Heckart

HOSTED APPLICATIONS: LOOK BEFORE YOU LEAP

So you think you're ready to deploy a network-hosted application? There are a few Application Service Providers (ASP) out there to

take your business. But before you dash off that request for proposal (RFP), you better make sure you know exactly what you want.

It's so early in the ASP process that many ASP service models are emerging, and no one knows what is going to remain in the end. Some ASPs will ex-

cute on more than one service model.

For example, some ASPs focus on software delivery over the network providing off-the-shelf software delivered online and hosted on the network. In theory, this means you won't have to store 100 million lines of code on your desktop. Some providers, such as Unintertworking, will provide enterprise resource planning applications, such as SAP's R3 or PeopleSoft, from a network-hosted platform. Other ASPs, such as MTT in Nova Scotia, will deliver basic software, such as word processing and spreadsheet applications, over the 'Net.

In the short term, this service model may suffer because most software has not been written for this type of environment. This is especially true for business software such as Microsoft Word, Excel and PowerPoint. Java-based programs have the advantage here, but as the market grows, many independent software vendors will help to rewrite current software. The beauty of this service model is you don't have to worry about software licensing and management, upgrades, revisions and so forth. That is handled as part of your service.

A variant on this service model is the management of software revisions and updates. In this model, you'll still have a software resident on your desktop; however, software revisions and bug fixes are managed by the service provider and downloaded from the network. If your business is short on MIS resources and managing desktop applications is not the top priority, then a service such as this could be appropriate. Your MIS people can then focus on more important, strategic projects.

Another variant on this service model is the development of customized applications to solve specific business problems for specific industries. These ASPs are likely to emerge out of the vertical industries they serve.

Some service providers will be in the business of helping the would-be ASP get into the industry. We see this being a great opportunity for today's facilities-based carriers. They don't have to know each specific industry or compete with ASPs on a niche basis. Instead, the ASP becomes a sales channel for their backbone services.

Given this broad spectrum of provider types, expect to send your RFPs to a lot of people who will come back with many different offerings. This is not going to be an easy apples-to-apples comparison because of the lack of uniform definitions, terms and processes. So if you are going to buy, expect to spend a lot of extra time defining what you want.

Briere is president and Heckart is vice president of the TeleChoice consultancy in Boston. They can be reached at dbriere@telechoice.com and checkart@telechoice.com.

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Briefs

ActiveTouch last week launched WebEx Offices, a free Web-based service individuals can use for meetings with multiple co-workers and clients. WebEx Offices enables real-time collaboration through a standard browser, as well as instant messaging, meeting scheduling, message notification and contact address books at www.webex.com.

ActiveTouch: (408) 980-5200

Elron Software has shipped CommandView Message Inspector, an NT-based content inspection tool for e-mail, newsgroups and File Transfer Protocol. It can filter out inappropriate material in order to meet corporate acceptable-use policies. CommandView Message Inspector starts at \$1,195 for a 25-user license.

Elron: (800) 406-5833

SAP AG plans to build Extensible Markup Language (XML) into its enterprise resource planning (ERP) applications by licensing technology from WebMethods. Initially, SAP will use WebMethods' XML business-to-business (B2B) application to XML-enable its SAP R/3 and SAP B2B Procurement applications. WebMethods' B2B software uses XML to allow ERP applications, legacy data and Web sites to exchange data.

Angara Database Systems has begun shipping its main memory database. The Angara Data Server is a relational database that uses RAM as its main data store, giving the database fast response times. The product is aimed at high-performance Web electronic commerce applications. Price varies, and the software runs on Unix, Linux and Windows NT.

Angara: (888) 952-5200

Management on the cheap

Here are 10 network and systems management tools that are free (or awfully close to it).

BY JEFF CARUSO

Consider the simple, nearly ubiquitous utility called ping. It's a network manager's first reflex, the first tool in the toolbox. Need to know if a server is reachable over a network? Ping it.

Ping, however, is just one of many useful and free management utilities readily available to network managers. In a large enterprise, such tools can be used to supplement commercial management tools and platforms. In a small environment, they may be all you have.

It's surprising how much free stuff is available. In addition to utilities such as ping and traceroute that ship with Unix and other operating systems, shareware and freeware management tools abound. Many network managers have grown frustrated with management software on the market; some have written their own quick tools to solve a problem and thrust them into the public domain.

Should an organization trust its network to free tools? Strategies differ. Some managers use the tools in conjunction with major network management software. Others use them as a backup system if the management platform fails. Still others depend on the tools everyday.

"In the old days, telnet, File Transfer Protocol, ping and traceroute were about all you needed to keep a small IP network running smoothly," says Mike Myrick, manager of network development and engineering services at the University of Mississippi. Over the past 20 years, the school has grown from a few hundred nodes to 13,400 connections.



"Contrary to what you might think, I still rely heavily on these simple tools," Myrick says. He combines them with other free tools, such as Scotty and Multi Router Traffic Grapher (MRTG).

"Using public domain and home-grown management tools is cheap and easy on a small scale," says Deke Kassabian, technical director at the University of Pennsylvania. "But once the scale gets large enough, there is a tendency to develop frameworks to use the tools together and to design common databases to help correlate their data. Real network management for large networks probably can never be done cheaply."

See **Management**, page 88

IN-SITE: Lessons from Leading Users

Managing the tightest ship in the shipping biz

BY JEFF CARUSO

For UPS—a company that has built its reputation on speedy package delivery—spending three months to distribute software within its own network was unacceptable.

It used to take that long, but now UPS can deliver software to thousands of its PCs and servers in three to five business days.

To achieve this acceleration, Atlanta-based UPS last year installed a software distribution application from Tivoli as part of a management framework that includes software for remotely controlling and monitoring systems.

UPS has made its move at a time

when so-called "framework" management software from vendors such as Tivoli and Computer Associates is coming under increasing fire for being expensive and difficult to implement. Part of the reason UPS went with the software is that the company found that the software had a function UPS could benefit from: software distribution.

Previously, UPS would update software across its 1,200 sites via a huge sneakernet, says Glen Barry, project leader of the Tivoli implementation at UPS.

"We would create more than 1,000 upgrade CDs, send them to regional tech support, and dispatch support people to each site," he says.

The support people would install the in-house software on Windows NT machines at each of the sites. The software helps UPS track the packages it ships around the country.

Now software is distributed and installed electronically from a central data center over a frame relay network to locations throughout the U.S. The company has performed more than 30,000 distributions since last August.

While UPS won't say how much it is saving by using the Tivoli software, Barry says, "We're happy with our return on investment."

The implementation isn't perfect, however UPS still needs to upgrade to the latest version of Tivoli Enterprise to

See **UPS**, page 60



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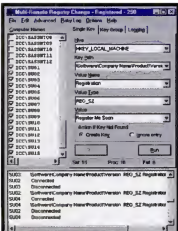
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Administrators in control with NT registry tool

BY JOHN FONTANA

Microsoft's Windows 2000 Beta 3 has finally made its entrance, but it's no secret that network administrators still need tools to get from here to there.

One vendor has set out to pave that path with a tool to ease management of both NT and Windows 2000 desktops. The tool provides a central location for managing the registry on NT, and eventually Windows 2000, desktops.



Eytcheson's Multi-Remote Registry Change allows administrators to make registry changes on networked NT desktops.

Eytcheson Software has begun shipping Version 3.0 of its Multi-Remote Registry Change, a tool that allows administrators to enter changes from a central location to the registry keys on one or more networked NT desktops. The registry keys control desktop configuration information for both hardware and software components, including supported services and wallpaper options.

The tool also works with Windows 2000 Beta 2 and Beta 3. The tool is a giant leap beyond RegEdit32, the utility Microsoft includes with NT for remotely altering the registry. RegEdit32 allows the same sort of remote controls as the Eytcheson tool, but network administrators can work on only one desktop at a time.

"Multi-Remote Registry is a must-have tool. It cuts so much bull from my work," says Amnon Feiner, systems manager for Ladoce Leasing in Thousand Oaks, Calif. "If you want to do desktop changes immediately, the way you do that is through the registry, and now I can centralize that work."

Feiner says his company recently deployed a new intranet site and he needed to set it as the default home

page on browsers installed on 100 machines. The process took 15 seconds using this tool," he says.

Feiner also recently used Eytcheson's software to update the scheduler feature on 2,000 desktops networked

over a WAN, completing the process in less than four minutes. The scheduler is used to run maintenance utilities on the desktop at set intervals.

The newest version of Eytcheson's software includes the ability to change [See Registry, page 64](#)

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Network World May 10, 1999 www.nwfusion.com 53

Microsoft's XML strategy generates doubts, ire

BY ELLEN MESSMER

NEW YORK — Critics contend that

Microsoft is trying to pollute Extensible Markup Language (XML) the same way it polluted Java.

Microsoft's electronic commerce strategy is largely based on its vision of XML, one that's a bit different from those

who believe in today's XML standard.

The company unveiled its grand e-commerce plan in March, an initiative squarely centered on BizTalk, the XML-based application middleware, server and tools it plans to make available in early release around July.

As described by Microsoft, BizTalk's XML components will let trading partners easily tie business data from Web-based purchase orders into enterprise resource management systems or back-end databases — the process known as supply-chain management. Microsoft

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Add Microsoft to the list

Messaging middleware, called "message brokers" by The Gartner Group, is used by corporations that want to move data into disparate enterprise resource planning systems and databases without having to rekey. Microsoft's BizTalk server and tools, expected out in beta in July, will compete in this arena. The most widely used message broker products are:

- Active InformationBroker
- BEAmessage Q
- CA's Impact!
- Frontec's AmTrix
- IBM's MQIntegration
- MQ Series
- MSMQ
- Neos's NeoNet
- Oberon's Prospero
- Tibco's MessageBroker
- TSI's Mercator
- VIE's Copernicus
- Vitria's BusinessWare

SOURCE: THE GARTNER GROUP, STAMFORD, CONN.

calls these XML plans its "value-chain initiative," a plan that's generating criticism and doubt across a wide spectrum of industry players.

Not surprisingly, one camp sees Microsoft as a hostile force out to capture the supply-chain management turf through a co-opted version of XML. At the World Wide Web Consortium (W3C), the industry group defining the XML body of standards, Microsoft is pushing a particular XML data specification that suits its plans. And that has some vendors fightin' mad.

"Microsoft is trying to co-opt XML the way they tried to co-opt Java," complains Jon Corshen, vice president of marketing at Tridac Technologies, a Tampa, Fla., procurement software vendor. "[Microsoft] tweaks it here and there so the only way you can run it is if you run the Microsoft platform. At the basis of BizTalk is a battle for the next-level operating system: the application server."

The BizTalk Server, which depends on the directory in the yet-to-ship Windows 2000, will be able to recog-

[See Microsoft, page 60](#)



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Modeling tool puts administrators on path to Windows 2000

BY JOHN FONTANA

There is no doubt there will be some heavy lifting if enterprise users

decide to upgrade their network operating systems (NOS) to Windows 2000.

User, group and domain data all will

have to be ported flawlessly for the migration to succeed. To ensure that success, network administrators will have to create models and test envi-

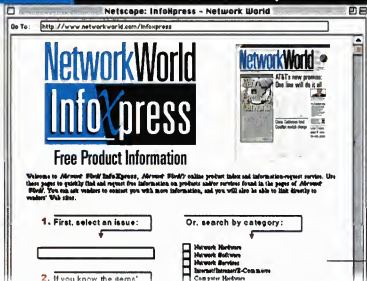
ronments before putting the new NOS into production.

To ease the burden, Mission Critical Software unveiled Domain Administrator 5.0, which provides an incremental upgrade path to Windows 2000 from NetWare or NT. The tool also supports migrations from NetWare to NT.

Domain Administrator lets network administrators use their production

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Super model

Mission Critical Software recently released **Domain Administrator 5.0**, which helps network administrators plan migrations to **Windows 2000** by creating models of domain consolidation plans and **Active Directory** structures. It also aids in carrying out those migrations. Here are the tool's highlights.

- Leverages existing **NetWare** and **NT** directory data.
- Uses production data for pilot and prototype environments.
- Incorporates reporting tools for assessing test results.
- Automates migration from **NetWare** to **NT 4.0** and **Windows 2000**.
- Automates migration from **NT 4.0** to **Windows 2000**.

data in tests of domain consolidation and **Active Directory** structures. To go one step further, network administrators can create multiple **Active Directory** environments in order to test which one might best suit their enterprise. **Domain Administrator** is part of **Mission Critical's OnePoint EA** suite of systems management software and is the first portion of the suite to be updated for **Windows 2000**.

Domain Administrator migrates directory data, file data and file security permissions to **Windows 2000** without having to rewrite or reinvent the design of their existing **NOS** topologies.

For the move to **Windows 2000** from **NT**, **Domain Administrator** allows for changes to be done in steps. Network administrators use a feature called **Active Views** to simulate **Active Directory** on the **NT** platform. They can create models of multiple **Active Directory** structures and drag-and-drop production data into those directories to test which ones are best for their enterprises. Once a model is chosen, a drag-and-drop procedure begins the migration of data to the **Active Directory** tree.

Restructuring domains and direct-
 See **Mission Critical**, page 64



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Novell, Foundry team to speed Web site traffic

BY ROBIN SCHREIER
HOHMAN

PROVO, UTAH — Novell is teaming with Foundry Networks to deliver transparent cache switching, a way to speed inbound Web pages to the end user and save network bandwidth.

Novell will promote Foundry's ServerIron switch as a front end to servers running Novell's Internet Caching Services (ICS) software. Together, the

cache has a new file system that doesn't require NetWare in the network.

ServerIron sells for \$6,000 with eight

10/100M bit/sec ports. Optional eight, 16- and 24-port blades with Gigabit Ethernet uplinks, and an eight-port 1G

bit/sec blade are also available.

Novell: (888) 321-4272; Foundry: (888) 887-2652



Foundry's ServerIron enables transparent caching when used with Novell's ICS.

tools can offer transparent caching, which intelligently balances the load among caches. With transparent caching, users can set parameters to determine what is cached and which cache serves up the content.

There are two ways to proxy a Web server. A forward proxy acts as the middleman between a user's request and the cache, and caches inbound traffic only. A reverse proxy sits in front of a Web server and is used to speed Web site traffic.

Novell's ICS acts as a forward proxy when used with the Foundry switch. The switch enables the caching to be transparent. ServerIron also balances the load among multiple caches.

When a user requests a page, the request is sent to a ServerIron switch, which uses Layer 4 port information to isolate HTTP traffic and send the request to the cache. If the cache has the content, it's served to the end user from memory. If the content is not in the cache, the cache goes through a router to the Web and retrieves the content.

The switch can be configured to only cache certain content or to allow a certain group of workers to bypass the cache completely.

ServerIron can also balance the load among caches. Customers typically deploy more than one cache for redundancy, and large enterprises deploy caches at each WAN access point.

Contingencies

The Foundry-Novell deal was contingent upon Foundry showing that ServerIron is compatible with Novell's ICS, which runs on a dedicated server.

ICS is only available on servers from companies that have an OEM relationship with Novell. Last month, Novell announced a deal with Compaq and Dell to sell ICS on some servers.

Although NetWare 5 is the core operating system under the covers of ICS, the

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Lotus extends Domino-to-ERP connections

BY PAUL MCNAMARA

CAMBRIDGE, MASS. — An upgraded integration tool will help Lotus

Domino customers tap into a broader range of back-end data sources, according to the company.

Lotus last week released Lotus

Enterprise Integrator (LEI) 3.0, a development tool that customers and industry analysts say will bring a wealth of legacy data to Domino-based Web

applications.

Through the use of an administrative graphical user interface, LEI allows the scheduling of high-volume data transfer or synchronization between Domino and enterprise systems, such as relational databases, enterprise resource planning (ERP) software and transaction processors. Programming is not required, Lotus says, although customization is possible through LotusScript and Java.

LEI will allow customers to rapidly build Web-based employee self-service and customer relationship management applications, Lotus says.

The upgrade includes support for a variety of new Domino Connectors,

New features in Lotus Enterprise Integrator

Formerly known as NotesPump, LEI includes:

- Multithreading support for faster data transfer
- Improved user interface for administrators
- The ability to meter data flow across connector sources
- Support for SAP R/3, J.D. Edwards One World, Oracle Applications/Financials, PeopleSoft R6 X and BEA Tuxedo

which tie Domino to specific back-end applications, as well as management and performance enhancements (see graphic).

Formerly known as Lotus NotesPump, the tool "has become a critical part of what we do," says Kent Rowe, manager of PC technologies at LNP Engineering Plastics in Exton, Pa. A manufacturer of specialty plastics, LNP uses the Lotus software to transfer sales and research data between Notes-based applications and an IBM AS/400.

The potential market for LEI is extensive, according to one industry expert. "Seventy percent of the Fortune 1000 uses Notes, and those are also the ERP users," says Paula Boyle, an analyst at Kinetic Information in Waltham, Mass. "It's a very natural blend to bring the two pieces together."

Moreover, tapping into legacy data can be difficult without a tool such as LEI, she adds. "People have been trying to bring it out by posting to intranets, but Lotus Notes offers a richer environment for sharing and discussions."

LEI runs on Microsoft Windows 4.0, OS/2 Warp 3.0 or 4.0, HP-UX 11.0, Sun Solaris 2.5.1 and IBM AIX 4.1.4, AS/400 and OS/390.

Available immediately, LEI sells for an estimated price of \$7,995.

Lotus says additional Domino connectors are being developed for IBM's MQ-Series, CICS, IMS and Transact/TS-Series. They are expected to ship by year-end.

Lotus: (617) 577-8500

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UPS, continued from page 1

get two critical functions, Barry says. One is the ability to distribute software to AS/400s. The other is a much leaner management agent that takes up only 250K bytes on end stations.

Framework vs. function

The software distribution function fits into the Tivoli Enterprise framework, which unifies many network and systems management functions under a common umbrella. Industry analysts say this approach is starting to lose favor because hundreds of management software start-ups are rushing into the market to provide individual functions at a lower cost.

"Most of the innovation these days is in the point tools," says John McConnell, president of McConnell Associates in Boulder, Colo. He adds that many users can get value from loosely coupled systems from different vendors.

"We framework vendors kind of do ourselves a disservice in leading with the framework rather than leading with the solution," acknowledges Leo Cole,

director of network management at Tivoli. Deploying and monitoring software are functions that users can derive real value from — and that should be the focus.

"The fact that there may be a framework (to those functions), you shouldn't care about," Cole says. "When you're doing an ROI analysis, do it on a function basis."

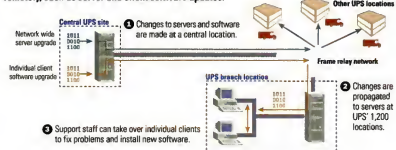
Giving UPS a boost

Other functions in the framework that UPS uses include monitoring servers at its many sites. Systems managers are able to keep an eye on performance problems and available disk space, Barry says. Once the managers understand and correct any problems occurring at one site, they can propagate corrections to other sites, ensuring that the problems don't crop up there, as well.

Barry says going with Tivoli also helped UPS because the company has

Overnight upgrades

Instead of sending support people out to each of its many locations, UPS performs more functions remotely, such as server and client software updates.



many different kinds of systems to manage — including mainframes, IBM AS/400 mid-range computers, Unix boxes, NT servers and OS/2 desktops. With Tivoli software, UPS can monitor and manage all these disparate systems using the same tools.

UPS' technical support staff also uses Tivoli's remote control software to take over computers remotely via the network and fix any problems.

"The frameworks tend to have value for large organizations, rather than small ones," McConnell says. A large company such as UPS can benefit from the tools being consolidated in one place.

As for the criticism that framework-based management software is difficult to implement, Barry says his implementation went off without a hitch. However, UPS went through a methodical

process of testing that started in June 1997. Implementation began in January 1998, and deployment wasn't completed until August 1998.

But with the framework in place, UPS is hoping it can easily plug in new applications. Barry says UPS will extend its use of Tivoli software next year with the vendor's new Cross-Site product. Cross-Site lets users send data securely through a firewall over an open network such as the Internet. While Cross-Site is intended for use between businesses that are partners in a supply chain, UPS plans to use it to send updates of salesforce automation software to its sales executives on the road.

Based on the success with Tivoli so far, UPS plans to implement Tivoli software for its entire worldwide operation by 2004. ■

Microsoft, continued from page 54

nize XML data, convert between data formats and send business data to be processed in back-end applications or value-added networks.

Microsoft says it will include its own XML data specification in its products — whether or not the W3C or anyone else approves it.

"This is not a Redmond Ivory tower project," says Marcus Schmidt, Microsoft's industry manager. "This will involve a collaborative effort to define the schema. But we don't want to be hung up in long standards reviews."

BizTalk XML will be supported not only in BizTalk Server, but in all Microsoft client applications, such as Outlook and the Microsoft portal, MSN. Microsoft is also signing up vendor partners for support. For instance, SAP says it would back BizTalk in its flagship enterprise resource planning product, R/3.

But Frank Buchheit, director of procurement and supplier management at SAP America, expresses some doubt about how soon that will happen. "We'll work with Microsoft, but at SAP, we're starting to work on Release 2.0 of

our business-to-business component for the R/3," Buchheit says. Whether BizTalk can make it into the next business-to-business release may depend on how far Microsoft gets in its XML plans.

"There's every indication with SAP that its interests are served by serving SAP, not Microsoft," says Ross Altman, research director at The Gartner Group.

In Altman's view, Microsoft's BizTalk is a push into the middleware product arena that Gartner defines as "message brokers." This is software used in supply-chain management to distribute purchase data plucked off electronic business forms that needs to be sent into inventory and warehousing systems.

There are already several software packages for message brokering, such as Neom's NeoNet and Tibco's Message Broker (see graphic, page 54). Microsoft is proposing its BizTalk initiative as the standard, Altman notes.

Altman is skeptical about the Microsoft effort. BizTalk "is mostly about integrating systems across enterprises," he says, but Altman doubts Microsoft can get so much done in the summer. He predicts "Microsoft will not offer a comprehensive set of integration middleware within the next three years." ■

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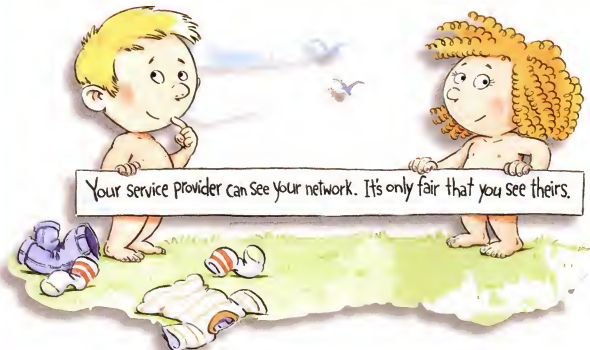
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Mission Critical, [continued from page 56](#)

stories, and shifting to a new operating system is no easy task," says Sue Aldrich, an analyst with Patricia Seybold Group. "This tool looks invaluable for

saving time and trouble."

Domains are consolidated by migrating user accounts, global and local groups, and NT member servers and workstations into Windows 2000. Domain Administrator automatically updates the file systems and access control

lists to reflect the new user accounts.

"We are trying to package all the domain stuff in one product," says Kent Erickson, director of product management for Mission Critical.

For NetWare users on versions 3.x through 5.x, Domain Administrator

migrates the schematic data of Novell Directory Services (NDS) and the NetWare Bindery to Windows NT and Exchange directories or to Active Directory. Group memberships also can be preserved, and NDS organizational units are mapped to NT security groups. NetWare users also can selectively migrate file structures, files and security permissions, and can retain all NetWare security settings.

The only task that can't be accomplished with Domain Administrator is migrating network printers because there is no way to remotely install printers in NT, according to Erickson.

Domain Administrator runs on both NT and Windows 2000, and is priced at \$27 per managed user account.

Also last week, Mission Critical released the beta of OnePoint Web Administrator, a Web client for the OnePoint suite. The interface is designed for routine departmental administration on NT and Windows 2000, such as creating user accounts and changing group memberships. The client will eventually become the standard interface for routine functions throughout the suite. It is expected to ship next month.

Mission Critical: (713) 548-1700

Registry, [continued from page 53](#)

single registry keys. For example, administrators can set file/save options and time zone settings and change start-up screen instructions. The tool also features controls on the security of remote registry keys. Administrators can add or remove users and groups from the access allowed, access denied and audit access control lists.

"Most security problems are users breaking things by changing settings or deleting system resources," says Greg Eytcheson, president of Eytcheson Software. "If you block changes, you can save hundreds of hours of administration."

The tool also lets administrators remotely change user names and passwords used for remote services. Other features include search and replace, which allows administrators to do tasks such as search for drive maps and replace them with new ones after changing the name of a network server. The tool also has a drag-and-drop feature for copying values from one key to another or copying keys from one computer to another. Auditing and query utilities also are included.

Multi-Remote Registry Change 3.0, which can support up to 25,000 machines, is available now and priced at \$35 per administrator and \$2 per managed computer.

Eytcheson: (316) 332-4604

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of multiple
operating
systems, what
printers speak
your language?



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EVERYTHING BUT THE PLUNGER

Symantec's Norton HelpDesk Assistant is a powerful suite for centralized support of network client plumbing.

BY RAM TACKETT



When you're having one of those days when your normal trickle of trouble calls threatens to turn into a flood, you can reach for a new suite of applications from one of the oldest names in the utilities business.

Norton HelpDesk Assistant (NHDA) Version 1.0 lets your help desk plug the leaks on your network clients

with an integrated package that includes five venerable Symantec applications on a single CD-ROM. Together they give you client troubleshooting and optimization, crash protection and recovery, and remote control in a single package. None of NHDA's components are new, and all are available separately.

Norton Utilities is the granddaddy of PC utility suites. It includes diagnostic and optimization utilities, such as Norton Disk Doctor and Speed Disk. Among the most useful utilities is Norton System Doctor, which gives you prioritized recommendations for the best way to solve computer problems, such as disk fragmentation and low disk space; and automatically executes programs to implement the fixes if it can. Norton Advisor provides an explanation and recommends a solution, listing common

disk problems and error messages from DOS, CHKDSK and some standard applications. Many fixes it recommends involve one of the Norton Utilities programs, which can be launched quickly using a command button that automatically appears.

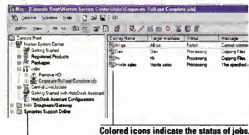
Norton System Center (NSC) reduces support costs by enabling you to distribute, manage and update the NHDA applications from a central site. It also allows you to manage Message Relay Targets—Windows NT servers designated as central event repositories for Norton AntiVirus alert messaging. You can keep the software for networked and mobile users currently using the LiveUpdate administration program included with the product.

Norton CrashGuard gives you crash protection; it intercepts exceptions before they swamp your applications, lets you continue working and can free frozen applications. In our test using a Microsoft Word macro designed to hang the application, CrashGuard's FreezeCheck successfully detected when Word was unresponsive and helped us save the contents of the document before shutting down the application. CrashGuard then asked whether we wanted to restart the application or Windows itself. CrashGuard didn't work as well when we ran into Windows' infamous "blue screen of death" after removing a CD-ROM from our test PC while the CD-ROM was being read. Repeatedly pressing ctrl/alt/delete on the test machine gave us only "Windows is waiting for a Close dialog to complete" messages, and the machine finally locked up. CrashGuard never tried to thwart the crash.

The pcAnywhere32 application makes it easy for help desk staff to connect to and control a user's PC, whether the user is at home, on the road or in a corporate office. The PCs can be remotely controlled via a modem or the Internet. In addition to remote control, pcAnywhere32 can quickly synchronize files between two computers using SpeedSend technology, which sends only the differences between the files.

You can install NHDA to DOS, Windows 9x or Windows NT clients from a Windows NT work-

The Norton System Center Snap-in for Microsoft Management Console



The left pane includes a list of available products and tasks.

station or server. The Administrator product can plug into the Microsoft Management Console, but if you plan to enable MMC integration, pay close attention to the chapter in the Norton System Center Administrator's Guide regarding NSC installation. For instance, if you plan to have Norton Event Manager and Norton AntiVirus—which does not ship with NHDA—installed on the same machine, Norton AntiVirus must be installed first. Norton Event Manager is an NSC snap-in, which can send notifications of virus activity on workstations through e-mail, the Windows NT Messenger Service, a network broadcast or SNMP.

Norton HelpDesk Assistant components

Norton Utilities 4.0 for Windows 95/98

Norton Utilities 2.04 for Windows NT

Norton System Center 3.1

Norton CrashGuard 4.01 for Windows 95/98/NT

pcAnywhere32 8.02 for Windows 95/98/NT

Norton Ghost 5.1c

While the other components are accessible from a single interface, Norton Ghost is not. Norton Ghost is a disk imaging and disaster recovery product that can significantly reduce the time and expense it takes to recover a crashed PC. With it you can recover whole hard drives and partitions. You can also restore individual directories and files from a pre-existing image file using the Ghost Explorer application that ships with NHDA.

Though Ghost is a thorn next to four integrated fingers, the whole suite really deserves a hand. Without involving the corporate help desk staff, NHDA helps maintain users' computer systems at peak performance levels, minimizing downtime and freeing the help desk to address other pressing support issues.

Tackett is president of Abacus Technologies, a network, application development and technology assessment company in Houston. He can be contacted at rtackett@abacustech.net.

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Pros

- ▲ Many useful preventive and diagnostic utilities
- ▲ Components are integrated under a single interface

Cons

- ▼ Lacks Norton AntiVirus

ScoreCard

	Diagnostics	Remote control	Crash protection	System restore	Centralized administration	Installation	Documentation	Total score
	20%	20%	20%	20%	10%	5%	5%	
Norton HelpDesk Assistant	8 x 20 = 1.60	9 x 20 = 1.80	8 x 20 = 1.60	9 x 20 = 1.80	9 x 10 = 0.90	9 x .05 = 0.45	9 x .05 = 0.45	8.60

Individual category scores are based on a scale of 1 to 10. Percentages are the weight given each category in determining the total score.



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Management, [continued from page 51](#)

Kassabian prefers to use a combination of free utilities and commercial software. He combines vendor tools such as Cabletron's Spectrum, Concord's Network Health and Network Associates' Distributed Sniffer with ping, traceroute, mon and swath.

Here are 10 management tools that can get you started managing on the cheap, in no particular order.

This is not an all-inclusive list — in fact, if there are other tools you swear by, let us know by e-mailing us at जारुसो@nww.com.

1. Ping (of course)

Ping, which some say stands for Packet InterNet Groper, has been around since 1983.

The program lets you know if one device can reach another over a network. Ping does this by sending an echo request using Internet Control Message Protocol.

This free utility has been ported to major operating systems, including

Unix variants, and Windows NT and 95.

2. Traceroute

Another common utility is traceroute. It's similar to ping, in that traceroute demonstrates if a packet

can make it from one device to another.

But traceroute also displays the route the packet takes through the Internet and the time it takes to get from one hop to the next. By

demonstrating these things, traceroute can show where delays are the greatest and where trouble spots may exist.

3. MRTG

MRTG monitors the traffic load on network links. The software collects traffic data from routers via SNMP and displays the data in a graph on a Web page.

MRTG keeps data over long periods of time, showing traffic trends for the past week, month or year. Network managers can configure MRTG to collect and display trends on any SNMP variable.

Many managers use MRTG to graph network trends, says Scott Parker, chief technology officer at Southemv Technologies, a consultancy based in Atlanta.

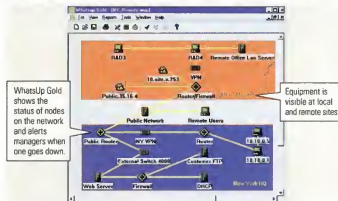
"Who wants to go buy SAS [Institute software] just to do graphs?" he asks.

4. Scotty

This utility is a network management platform based on the Tool

Mapping on the cheap

Ipsewitch's WhatsUp Gold creates maps of users' networks. It may not be as fancy as the major network management vendors' software, but it does the basics.



This IT manager is monitoring capacity in Chicago.



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Command Language. With it, network managers can write scripts to automate network tasks. Scotty discovers what devices are connected to a network, filters events, provides for troubleshooting and includes a browser to look at an SNMP management information base.

"Scotty is not as extensible as Hewlett-Packard's OpenView or SunNet Manager, but it performs the basic functions I really need, at no cost," the University of Mississippi's Myrick says.

5. QueSO

Que Sistema Operativo (QueSO) is a utility that can tell you what operating systems are running on remote hosts by sending TCP packets that don't make sense to the host.

Standards don't define how operating systems should respond to nonsensical packets, so each operating system has a distinctive response. QueSO compares the response against a list of known operating systems and lets you know if it finds a match.

6. Nmap

Like QueSO, nmap scans the network for hosts, revealing what operating system and services those hosts are running.

Nmap sends out parallel pings to all servers on a network to see which ones are up, and it scans for TCP ports to see what services — such as e-mail and Web pages — are available on the server.

7. Tcpdump

The Unix utility tcpdump prints out the headers of packets that go through the computer's network interface.

Network managers can filter out the specific packets for which they're looking. They can look at packets using a particular protocol, check for those bound for a specific destination or find packets by using a certain TCP port number.

8. Mon

Mon is software that can monitor network resources, watching for server problems and ensuring that services such as Web pages and

e-mail stay available. Network managers can configure mon to watch the service of their choice and generate an alert if that service goes down.

9. Swatch

No relation to the manufacturer of precision timepieces, swatch, or Simple Watchdog, is another Unix utility. It monitors messages written to the Unix system message log. Based on what messages are written there, swatch can take actions to notify a network administrator. For instance, if the file system is full, swatch could notify the administrator by sending an e-mail message.

10. WhatsUp Gold

Ipswitch's WhatsUp Gold is the only utility on this list that costs money, but at roughly \$700, it costs quite a bit less than most network management software.

The product can tell network managers when a device or service fails (see graphic, page 68). Ipswitch this month is shipping Version 4.0 of the utility, which adds reporting capabilities.

The software keeps a running tab of how often and for how long devices go down, and generates reports on the information. Network managers often use the product as a backup to other commercial network management systems.

There are plenty of other free utilities available, including some on the security side. Even if you use commercial management products, your toolbox is not complete without at least a few of these free tools in it. ■

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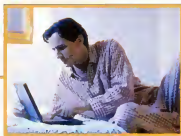
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INTERACT

NETWORK MANAGEMENT

TRAFFIC MONITORING

ELECTRONIC BILLING

BEA clusters Java components, boosts Web performance

BY JOHN COX

SAN JOSE — Keeping a critical

electronic commerce application up and running is the focus of BEA Systems latest Web application server.

BEA's WebLogic 4.0, through a \$5,000 add-on, creates copies of Java software programs, called Enterprise

JavaBeans, and runs them simultaneously on several WebLogic servers. As a result, this cluster of programs can handle a larger number of user requests and balance the traffic load of requests across several WebLogic servers.

Finally, if one copy of the program fails or goes offline, the other copies remain available so the Web application keeps running. Unlike a traditional HTML Web server, WebLogic is aimed at applications that use or create fast-

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BEA's latest Web apps server

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- Creates copies of Java components.
- Runs the copies on multiple WebLogic servers.
- Balances workload by shifting requests among servers.

changing data, such as a car builder buying parts via an intranet from a supplier, or hundreds of consumers buying books through an online book store. Application servers run key parts of the application code and usually sit between the Web server and various back-end databases and transaction systems.

The new BEA software boosts the performance of this middle-tier server so it can handle the fast-growing, always shifting traffic loads found in e-commerce applications, says Scott Dietzen, chief technology officer of the WebXpress division of BEA Systems in San Jose.

The WebLogic server code was changed to support the new Java Bean clustering, at least via the \$5,000 option. The server code was also tweaked in many areas to boost performance, according to Dietzen.

BEA claims that tests made using third-party measures show WebLogic 4.0, with the clustering option, could support up to 2,627 Web page views per second. The software was loaded on a trio of 4-CPU Windows NT servers. In the tests, the setup was able to support 10,000 concurrent users, according to the company.

Available now, after a five-month beta test, WebLogic Server 4.0 is priced at \$10,000 per server CPU. Interested users can obtain a free evaluation copy from www.bea.com/weblogicservers/.

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'Net Insider, Scott Bradner

THE ABSURDITY OF PUTTING LIMITS ON TECHNOLOGY

The U.S. government still seems to think we know how to do encryption better than the rest of the world and limits the quality of the encryption

technology that can be exported.

This is a demonstratively silly idea, yet the U.S. government persists in its delusions. At least I assume they are

delusions because the only other obvious explanation would be that Clinton administration officials are being overly conservative with the

truth in front of Congress.

Recent developments in the cryptography field will make it still harder for the administration to maintain that limiting the quality of exportable encryption technology does anything other than harm U.S. companies.

Israeli scientist Avi Shamir recently announced that he had developed yet another way to help break the secret keys for what is currently regarded as the best type of encryption in use on computer networks.

Shamir is the co-developer, along with Ron Rivest from MIT and Leonard Adleman from the University of Southern California, of the RSA public-key cryptography technology. RSA and other public-key cryptosystems are already widely deployed in computer systems and are seen as the best hope for scalable and reliable encryption systems for use on the Internet.

Shamir's new announcement regards a special computer, at this point only a proposal, which would significantly improve the ability of code breakers to find the secret key needed to decrypt data that has been encrypted using public-key cryptosystems.

It might seem a bit counterproductive for an inventor of a public-key cryptosystem to help develop methods for breaking the security of public-key cryptosystems, but this is typically how people in the crypto business work. Unless you try to break the encryption, you do not know how good it is. In addition, one has to assume that government agencies in many countries are doing their best to break cryptosystems used by rival governments (and businesses in rival countries).

But Shamir's announcement means that the quality of the encryption needed to protect the secrets of American businesses now has to be higher than it was before. The encryption picture is constantly changing. The only sensible thing to do — if the administration is serious about protecting the assets of American companies abroad — is to remove all limits on the quality of the cryptosystems that can be exported from the U.S.

The administration tells horror stories about the dangers of pedophiles, terrorists and foreign spies using encryption to thwart the efforts of law enforcement officials. But the administration must assume the existence of a really strange class of criminals — people too dumb to surf the Web to get good encryption software and too smart to get caught via normal law enforcement methods. It's a strange world the administration lives in.

Disclaimer: Some claim that it's a strange world Harvard lives in, but the above are my observations.

Bradner is a consultant with Harvard University's System Information Systems. He can be reached at sob@harvard.edu.

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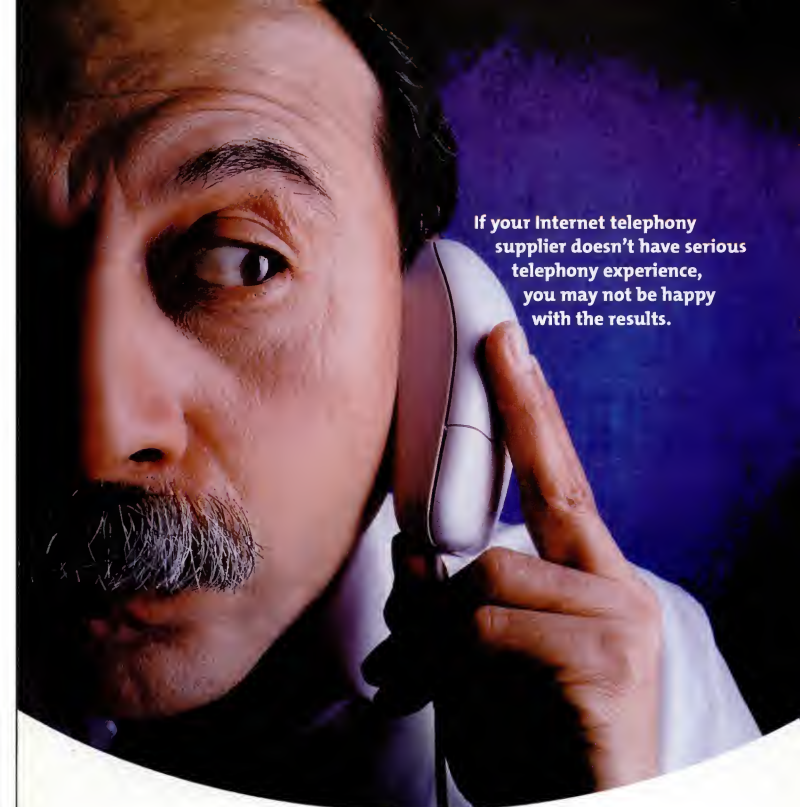


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Circle 16 on Reader Service



Technology Update

An Inside Look at the Technologies and Standards Shaping Your Network

Ask Dr. Intranet

By Steve Blass



Via the Internet

Use the IP Multicast-routing command in the global configuration mode to set up IP Multicast routing. You need to configure the Protocol Independent Multicast (PIM) protocol for each interface on which you want to run multicasting. (This also enables the Internet Group Management Protocol.)

If you want your routers to forward all multicast group packets, use Dense Mode PIM. To configure this PIM on Interface 1, for example, you'd use the commands "interface ethernet 1" then "ip pim dense-mode."

If you want your routers to restrict multicast forwarding by requiring explicit JOIN requests, configure PIM in sparse mode. You'll need to define the leaf node router's multicast rendezvous point router and include that in the configuration commands. For example, to configure Interface 0 to operate in sparse mode with a rendezvous point one hop away at IP address 10.1.2.3, you'd use the command "ip pim rp address 10.1.2.3" in global configuration mode. Then issue the commands "interface ethernet 0" and "ip pim sparse-mode." A sparse-mode device option allows an interface to operate in either mode based on the properties of the multicast group using the interface.

As a network architect at Sprint Intranet in Houston, Blass understands the strain of developing and managing intranets.

Send your problems to drintranet@paranet.com.

COPS lays down policy-management law

BY MIKE COOKISH

Policy-enabled networks promise to help net executives more effectively allocate network resources and reduce management overhead. Turning these promises to reality, however, will require several key infrastructure elements.

These elements include policy servers and policy-aware switches, routers and end stations. According to the Internet Engineering Task Force (IETF), policy servers, called Policy Decision Points (PDP), will make most policy decisions. Policy-aware switches and other devices, called Policy Enforcement Points (PEP), will be charged with controlling application access to network resources.

Helping PDPs and PEPs coordinate their policy undertakings—and helping them interoperate, even though they may come from different vendors—will be a protocol, known as the Common Open Policy Service (COPS), now in draft form at the IETF.

COPS will be charged with maintaining communications between the various policy servers and enforcement devices used in LANs. COPS' chief virtue is its ability to maintain "state" between PDPs and PEPs. That ability means that COPS is able to give a policy server an ongoing awareness of PDP and PEP activities; any change in operating environments or in specific policies can be implemented quickly and efficiently.

Other network management protocols such as SNMP can be programmed to do the same, but they would demand greater administrative overhead—and would introduce greater complexity—than the simple, straightforward COPS.

COPS is a query-and-response protocol that relies on TCP/IP as its transport mechanism. COPS' essential function is to carry messages between a policy server and its various clients, the PEPs.

For instance, a local Layer 3 switch or router receives a Resource Reservation Protocol (RSVP) request to initiate a session with another network node. The switch—with a PEP device in policy terms—needs to perform admission control, a function that determines if sufficient resources exist to fulfill the request. Second, the switch needs to ensure the requesting user is authorized to make the request.

Typically, the switch can make the admission control decision locally. But the device most likely will need to con-

sult a policy server—a PDP—for a policy control decision. Without this consultation, a situation could occur in which the first RSVP request gains all the switch's available bandwidth, and subsequent requests are denied until the first requestor's session ends.

Here's where COPS makes a real difference. Through the already-open TCP connection—COPS opens a connection as soon as a PDP or PEP device boots up—the switch consults the server through a COPS message. Each COPS message includes client-specific information along with the actions the requestor is asking the target device to perform.

Carried within these messages are objects of variable lengths that carry the necessary information to complete the message. In the first Request message, for instance, one or more COPS-encapsulated objects might be used to identify the client and define the type of event that triggered the query. And in the Response message, a "decision object" would carry the actual policy decision.

In all, the COPS protocol allows for 10 message types, from Request and Response to Report State, Synchronize State, Client-Accept and Client-Close. Upon device start up, for instance, a newly booted switch typically issues a COPS request to begin tracking the state of this particular PEP. Another message, Keep-Alive, is issued periodically in order to determine if a PEP or PDP has become inactive.

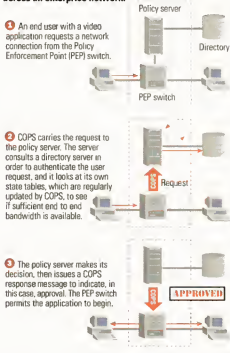
Through the combination of this simple message set and the encapsulated, client-specific objects, COPS is thus able to track and update the states of numerous PEPs and PDPs, without requiring undue administrative overhead.

Network vendors and users expect

HOW IT WORKS

Common Open Policy Service

COPS is a simple query-and-response protocol that relies on TCP/IP as its transport mechanism. COPS' essential function is to carry messages back and forth between a policy server and its various clients. The idea of COPS is to ensure that policies are enforced across an enterprise network.



COPS to play a key role within the evolving industry framework for policy-enabled networks.

Such a framework will make use of several protocols—including but not limited to Lightweight Directory Access Protocol for directory access; Remote Authentication Dial-In User Service and DIAMETER for user authentication; SNMP for client/server communications in older networks; RDP 1p for LAN priority; and Differentiated Services for WAN priority.

Cookish is director of marketing for the Network Management Division of 3Com. He can be reached at Michael.Cookish@3com.com.

Gearhead — inside the network machine . Mark Gibbs

SLICK MULTIMEDIA CONTENT WITH A MINIMUM OF FUSS

Way back in June, *Network World* ran an article called "Multimedia with a SMIL" (www.nwfusion.com/intranet/0629/handbook.html).

Gearhead is impressed with what has been happening implementation-wise since that story was penned. Back then, the only tool that could render Synchronized Multimedia Integration Language (SMIL) content effectively was the G2 RealPlayer from RealNetworks.

(Note: If you haven't checked out the G2 RealPlayer, you are missing out on a remarkable piece of software. Not only can the product deliver excellent streamed audio content, but it also handles video remarkably well and full SMIL specification with ease. In particular, check out www.netradio.com for a large selection of continuous music channels.)

SMIL is pronounced "smile" and was developed by the World Wide Web Consortium. The technology was released June 15, 1998 (www.w3.org/Audio/Video).

SMIL allows you to create presentations in multiple media formats and synchronize the various media to



ensure that things happen when they are intended to. The beauty is you can use a simple text editor to orchestrate the events.

Now why should you care about SMIL? Because it is the easiest way to create slick, multimedia content with a minimum of fuss.

Moreover, SMIL presentations are much less of a bandwidth hog than full video, while being more media rich than just simple audio with background sound. SMIL has applications for teaching, sales presentations and anything else where a complex message needs to be delivered with a minimum of fuss.

SMIL content (at least according to the standard found at www.w3.org/TR/REC-smil) can include URL links,

streamed and unstreamed audio and video, as well as text. Note that SMIL doesn't define which media types can be used, it just defines a framework for them that controls timing and screen layout (both position and ordering — for example, which media elements overlap).

Some of the demonstrations are impressive. Gearhead really liked "Porsche History," created by Caribiner International at <http://ramhurl.real.com/smilidemohurl.html>; file=smil/entertainment/porsche/porsche_start.smil; and "Tour the Getty Center," by RealNetworks at <http://ramhurl.real.com/smilidemohurl.html>; file=smil/entertainment/getty/getty_start.smil.

Since last July, a number of SMIL players have been released — several of them as Java applets and many of them free. We tried out one of the newest, the SMIL Output in Java Applets (SOJA) Cherborg from Helios (www.helio.org). We'd love to be able to tell you more about Helios, but all we could find out is that it is an association in Melun, France.

SOJA Cherborg is Helios' most recent release of this all-Java SMIL

player, and it is free. You can download the software from www.helio.org/products/smil/download/soja-cherborg.tar.gz.

SOJA presentations are embedded in the browser window and can handle GIF and JPEG images, AU and zipped AU formats, and plain text files. We tried out SOJA with a number of SMIL presentations and found it worked flawlessly. And, by golly, the price is right.

Another SMIL player that impressed us is SMILEbaby, a free-for-personal-use Java applet that is in beta release (<http://cr518337.a.yec1.com/wave/home.com/SMILEbaby>).

SMILEbaby is a lightweight player — it only works with JPEG image files and mono sound, which makes it small and fast-loading.

Even so, it works very well, and a neat demo can be found on the SMILEbaby site (note that this is a Sun promo for Pure Java — it's mildly amusing).

SMIL is definitely a technology to keep your eyes and ears on.

Media madness to gearhead@gbbs.com.

NetworkWorld Fusion Spotlight

News, tips and tools from our Web site

Fusion Face-off: Where to buy your LAN gear

With some vendors expanding to offer a full range of enterprise gear, deciding from whom to buy your LAN equipment can be confusing.

Do you go with a full-spectrum equipment provider or stick with a LAN specialist? Executives from 3Com and Extreme Networks will be online this week to battle over your dollars. Get your questions ready, then head

over to:
DocFinder: 2829

Has this happened to you?

Last week, Executive Editor Beth Schultz described the problems one end user had downloading Portable Definition Format files from a corporate extranet because he didn't have the appropriate reader software.

Readers reacted to that story in different ways.

One said, yes, IS has to think like an end user. But another said: "The reason that corporate IS usually doesn't install anything on your machine" is because users go off and find poorly written screen savers or cutesy toys that end up corrupting their systems. They then scream at IS because their machine doesn't work."

What do you say?
DocFinder: 2836

E-mail as trespassing?

You may have read how a California judge recently ruled that spam is a form of trespass, and Intel has the right to pursue charges against an ex-employee who was sending mail to its workers via the company mail server.

What do you think? Should the former employee have the book thrown at him, or would that be a violation of his First Amendment rights?

Join our discussion at:
DocFinder: 2828

Beyond the future

What wondrous things does the future hold for your network? Well, maybe not many, if you ask our more dour readers.

Sure, some folks agreed with our predictions that desktops will die and wireless will rule. But others in our future forum disagreed.

One reader, for example, says we ignored inertia — he thinks systems and people are just more resistant to change than we'd like.

"I'll expect wearable computers to become pervasive the day I get my dress shirt back from the cleaners with the collar creased properly," he says.

What do you think? Gaze into the future with us at:

DocFinder: 2827

Constitutional right to online privacy?

Network World columnist Ira Brodsky says he has had enough of online people whining about privacy erosion. The Constitution does not mention "privacy" at all, and if you don't like your personal information becoming public online, then don't use the Internet, he says. As you might expect, some people disagree. See what they say, and how Brodsky replies.

DocFinder: 2741



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e-business tools

Editorial Insights

NetWare as a leading apps platform? Get used to it

Bill Gates' repositioning of Microsoft for the Internet is the stuff of business magazine legend. The restless software czar, stung by upstart Netscape, turns his empire on a dime to face the Web challenge. Stirring.

But there's another Internet repositioning act going on that may prove even more impressive. Novell CEO Eric Schmidt has dragged NetWare from its defensive position as an NT-ravaged also-ran to a bright future as a hard-core Net applications platform. And given the evolution of Java and e-commerce, Schmidt and Novell are heading for the sweet spot of the market.

It's hard to grasp the idea of NetWare as a robust applications server. I know — I covered the announcement of AppWare more years ago than I care to remember. NetWare was always hamstringing by its inability to support applications.

But that's changing — dramatically. NetWare 5 is a fast engine for Web applications, and Novell is going beyond performance by making NetWare a back of a development environment. It has huddled Oracle 8i, IBM's Websphere, and Netscape Enterprise Server. The company also plans native HTTP support and clustering, and multiprocessor enhancements. With a strong directory, management tools and caching services, Novell has found a very capable platform for the network-centric applications that a growing number of developers and enterprises are building. And NetWare is only going to get better in the months (years?) before the bloated Windows 2000 arrives.

A big challenge for Novell is that many customers don't buy an operating environment simply because it is the fastest or most open. They buy it because a particular application runs on it. That's where Microsoft's strong ties to enterprise applications providers and the top software makers are so important. Novell should cultivate stronger relations with developers, but time and technology will aid the cause, as well. More software companies are building for the open Web environment, and that will weigh the weight of their development efforts over to Novell's side.

Novell is somewhat reluctant to boast about NetWare's new application strengths because it doesn't want to go head-to-head against Microsoft during this rebuilding period. But that should change. It's too good a story for Novell to keep to itself.

— John Gallant
jgallant@nww.com

Message Column

ADVICE TO CISCO

Your article "Cisco's voice plans lead to telephony throne" (April 19, page 36) is a blatant example of how blind the data world is to the real world of business telephony. I agree that Cisco is building a formidable empire and already has a firm foothold in the telephony arena. However, Cisco must make some drastic changes in its approach to telephony before it can provide any kind of viable replacement to the modern PBX.

So far Cisco's approach has been to provide basic voice connectivity only. I have seen no move toward providing any of the features that have been the actual motivations for purchasing or upgrading switching equipment.

There are three problems that Cisco either is overlooking or mistakenly thinks have been overcome. The most important of these is reliability at the desk-top level. End users will never be satisfied with telecommunications that supply even the same reliability as the best operating systems on the market today. We think nothing of rebooting a PC, but try telling someone they have to reset their telephone.

Functionality is the next major issue. Users expect PBXs to be unique right down to the feature buttons and messaging on telephone displays. Having dial tone at the desk-top and inexpensive long distance is nice, but users want to be able to multitask and work with their phones.

Finally, Cisco isn't all that price competitive in this arena. A small router to connect two sites with standard telephones via frame relay is actually quite a bit more expensive than a feature-rich PBX connected via a T1. The only savings might be realized over time because frame relay is typically less expensive than a dedicated T1.

I am extremely impressed with Cisco's focus on convergence. I also believe Cisco would be better off developing the foothold it has in providing the best possible WAN connectivity for PBXs.

Russell Wynne
Engineering manager
UNITEL
Grand Junction, Colo.

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TAKE A NUMBER

I strongly disagree with Mark Gibbs' "no naming convention" idea ("A site by any other name," April 19, page 82).

In the business world today, having a good name on the Web is like having another business card.

Would you rather have sales representatives say "Please check out our demo at <http://demo.companyname.com>" or "You can get our demo at <http://5216549870>"?

Why in the world would we want yet another number to memorize? Nobody wants to be just another digit in a pool of digits. I also think the likelihood of making a mistake when you type one of these numbers is very high. It would be exactly like dialing a wrong number and just as annoying.

We have quite a bit to lose by converting to such a convention and nothing to gain. Seventy-five bucks for two years' ownership of a name is well worth the price.

Will Reinhardt
Internet services manager
Bristol Hotels and Resorts
Dallas

There are a few problems with Mark Gibbs' idea about referencing Web sites by IP addresses rather than names.

What if a company's IP block changes? Getting information updated on a search engine can take up to six months, a Domain Name System (DNS) change takes roughly 72 hours.

What about e-mail? A message sent to www.gibbs.com may go to the IP 216.101.69.2, but what if you had a record in your DNS that routes all e-mail to 216.101.69.3? Many large companies do this. Or what if www.gibbs.com was different than mail.gibbs.com and ftp.gibbs.com?

Although I don't like domain name registrar Network Solutions, Inc. much, the naming convention is nice.

James Bailey
IS director
eCompany
Corona del Mar, Calif.



BRIDGING THE GAP BETWEEN NOS AND ENTERPRISE DIRECTORIES

With its recent announcement of enterprise directory capabilities for Novell Directory Services Version 8 (NDS), Novell has come off the ropes to battle Microsoft, Netscape and other companies for corporate directory dominance.

NDS 8 is the first product that begins to bridge the gap between enterprise and network operating system (NOS) directories. Typically, enterprise directories are relatively centralized and information rich, whereas NOS directories are highly distributed and information poor.

NDS is firmly entrenched in the NOS directory category. And with ZENworks and NDS for NT, Novell has augmented its NOS product line with cross-platform, directory-based management tools.

In addition, with its BorderManager firewall and Internet Caching System, Novell has entered the lucrative market for electronic commerce "boundary" products. But until now, NOS-centric NDS has had trouble competing effectively with Netscape's Directory Server for e-commerce directory business.

Moreover, Novell has had to fight a war of words with Microsoft, which has positioned its yet-to-be-released Active Directory as an enterprise directory as well as a NOS product.

Several key enhancements make NDS a contender for the enterprise and e-commerce directory environments. For example, Novell has reworked the NDS database engine to enable very large partitions.

In addition, Novell has announced plans for a Digitaline profile applet that customers or partners can fill out in their browsers. This kind of self-service directory update helps keep content fresh and lowers administration costs.

However, for NDS to fully bridge the NOS, enterprise and e-commerce directory worlds, Novell must add or improve metadata directory tools, public-key infrastructure support, catalog integration and native Domain Name System support.

The good news for Novell is that while much remains to be done, the company has at least a six-to-



12-month window before Windows 2000 rolls out. But even then, the first release of Active Directory will lack many enterprise directory capabilities, such as metadata directory services and multiple-schema support.

Customers, especially NetWare users, should seriously consider piloting NDS 8 over the next few months. If it proves itself ready, try to deploy at least a test installation of the product on your network prior to your Y2K freeze. Not only will NDS 8 and NetWare 5.0 offer some attractive enhancements, they'll also give your organization valuable experience with a directory-enabled environment. And you'll have the opportunity to find out whether it's now possible to bridge a single logical directory across the NOS, enterprise and e-commerce directory levels.

Blum is a senior vice president and principal consultant with The Burton Group, an IT advisory service providing in-depth analysis for network planners. He can be reached at dblum@btg.com.

Speaking the LANguage . Linda Musthaler

APPLIANCE SERVERS MAKE SINGLE-TASKING A SPECIALTY

When I got up this morning, I brewed a pot of coffee and made some toast. These actions required two distinct appliances, and because I used these highly specialized machines, the results were excellent. My coffee was fresh and hot, and my toast just slightly brown, the way I like it.

Every computer vendor with an ounce of foresight seems to have awakened to this notion of

using a highly specialized machine to perform just one or two functions, and to perform them very well. Since January, there has been a wave of announcements about the category of computer called an appliance server, or a thin server.

An appliance server is a computer with a very focused purpose. It's usually meant to do just one task, and do it with superior performance and higher reliability than a general-purpose server. Though this might sound a little like a new concept, it has been around for a number of years. For instance, Cisco made its fortune by creating a computer that did nothing but route data packets around a network. Other functions that are ideal for appliance servers include file storage, data serving, Web caching, security and messaging.

Another key feature of an appliance server is that it is a turnkey product. The computer that you purchase must already contain the operating system and application instructions, tuned and ready to perform the intended task. You just plug it in and let it go. What a joy for tired network managers who are

accustomed to hours of cajoling general-purpose servers into suiting their needs.

If there's any doubt about appliance servers being the next big thing, just look at the stunning growth and financial performance of Network Appliance (NetApp), a company dedicated to developing and marketing network data servers. Since 1994, NetApp has grown from two dozen or so employees and revenue of \$2.2 million to close to 500 employees and revenue of \$166.2 million.

NetApp isn't the only computer company to tap the appliance server market. Novell is making a very strong comeback with its Internet Caching System (ICS) technology. Companies such as Compaq and Dell have licensed ICS to create new appliance products that will speed access to Web pages by caching frequently used information and placing it closer to the users.

Of course, Novell isn't the only player delivering Web-caching products. I predict these types of thin servers will be almost as common as routers within a few years. It will be inconceivable to have a network configuration without one. With Web-based information increasingly coming in the form of audio and video, and with thousands of new users jumping on the Internet each day, Web caches seem to be simple solutions to bandwidth constraints and sluggish performance.

Appliance servers are a boon to small companies that don't have a dedicated IS group. How many owners of florist shops and dry cleaners are savvy enough to shop for a general-purpose server, select a network operating system and application software, install and configure it all, and get the desired productivity gains, all for a few thousand dollars?

Now these entrepreneurs can buy a small business server in a sealed "black box," bring it home and plug it in. Within as little as 30 minutes, the server can be connected to a few dozen PCs and delivering services such as e-mail, Internet access and shared print and file services.

Whatever your company's size, your network can find a performance edge today with the various types of appliance servers pouring into the market. Use them to speed access to Web pages, serve data from disparate sources, manage the tide of mail for thousands of users and secure access to your network.

But we're still in the early phases of this stage of network computing. The big advances will come in a few years when you can purchase an entire enterprise resource planning system as an appliance. That might sound laughable now, but who would have thought a few years ago that you could buy a simple box with a full network OS and complete suite of applications — ready for use right out of the carton — for under \$2,000?

Musthaler is vice president of Currid & Company, a technology consulting firm in Houston. She can be reached at linda@currid.com.



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FACE-OFF

Is it better to buy from a LAN specialist or a full-spectrum equipment provider?



BY GORDON STITT,
EXTREME NETWORKS

Vendors that focus primarily on LANs can provide you with a flexible, high-performance infrastructure at a low cost of ownership. It is a myth that large, full-spectrum network companies can provide end-to-end offerings that will cover all aspects of the enterprise well. Most full-spectrum companies have grown through acquisitions and offer inconsistent products that are significantly more expensive to own and do not provide strategic advantages.

In the past, full-spectrum network companies used proprietary protocols to link various parts of the enterprise. Today, IP is the only protocol that matters. Ethernet, routing and Layer 3 switching are the technologies for LAN interconnection, and most suppliers support standards for Ethernet and Layer 3 switching. Consequently, users don't need the "breadth" of a full-spectrum network company to design, install and run an enterprise LAN. Instead, users can benefit by choosing vendors that provide the best products and then interconnect them.

This situation places the large, full-spectrum network companies at a sudden disadvantage. These companies have grown by acquiring smaller network companies. As a result, many full-spectrum vendors now provide a complex mix of equipment that consists of products from many different companies. These large suppliers then spend most of their research and development on integrating newly acquired products, rather than on innovation. Customers pay the price for this complexity in the form of a higher cost of ownership and integration delays.

In contrast, a LAN-focused company is in control of its vision and product architecture. It can provide a consistent end-to-end enterprise LAN infrastructure that is much simpler, more powerful and far more scalable for future and existing applications, such as enterprise resource planning, electronic commerce and voice over IP. The results are lower cost of ownership and a huge business advantage.

So how do you decide whether to go with a small LAN specialty vendor or a full-spectrum network company?

Look carefully for discontinuity in technology and requirements. For example, LAN and WAN requirements are very different. WANs have somewhat limited bandwidth and are expensive and slow to provision. LANs have large amounts of bandwidth, are easy to provision and offer lower bandwidth costs. You should choose the best products for these distinct areas.

LAN specialty vendors are well-equipped to develop the best technologies. They are able to embrace new technologies, such as Gigabit Ethernet and Layer 3 switching, with speed and efficiency. And they are poised to deliver products to customers much more quickly. Businesses that adopt these new technologies can gain a tremendous advantage over competitors that do not.

Recognize the discontinuities and the natural point of demarcation between LANs and WANs. Then choose the best products in each area to meet your specific needs. And instead of negotiating with one company for all your network products and services, you'll be in a much stronger bargaining position by introducing specialty vendors into your supplier mix.

Stitt is president and CEO of Extreme Networks, a Santa Clara, Calif., manufacturer of Gigabit Ethernet Layer 3 LAN switches. He can be reached at gstitt@extremenetworks.com.



BY ANDY GOTTLIEB, 3COM

Relying on a LAN specialist — typified by the high-tech start-up — can be tempting if you base your decision on product specifications alone. And in a world of standards, the specialty start-ups brag that their hot boxes can fit seamlessly into any multivendor environment. But good product specifications and standards compliance are only table stakes, the minimum requirements to get into the game for small and large vendors alike.

As networked applications become more and more important to your company, broader issues than speeds and feeds emerge. To adequately address these issues, you need a large, full-spectrum vendor that offers a complete systems approach to the LAN, depth of experience, breadth of customer service and support, and the full range of WAN and remote access products that complement the LAN.

There's a growing need for a complete systems approach to the LAN. Vendors must offer the broadest range of products to satisfy a user's total needs. Single-vendor technical commonality among these products simplifies operations and future-proofs your network against complete swap-outs as, for example, the LAN core grows. Small vendors cannot match the choice of scalable, compatible, commonly managed products from full-spectrum vendors.

The depth of a vendor's experience is built over time, over thousands of customers. The full-spectrum vendor's deep pockets provide a broader selection of customer support programs, including a menu of services to fit every budget.

Full-spectrum vendors are better equipped to troubleshoot problems as well. Because applications today span entire enterprises, what appear to be LAN problems may actually be symptoms of WAN, remote access, carrier, ISP, desktop or server problems. Having a vendor that thoroughly understands issues beyond the LAN will make your life easier.

And being able to reach your vendor for help becomes essential as well, especially when your mission-critical network hits a glitch at 3 a.m. Full-spectrum vendors can provide customer support with live technical representatives manning the phones 24/7 across the globe. LAN specialty shops may only be able to offer restricted business-hour live support due to limited resources.

Because LAN specialty vendors are focused on only a slice of the user's problem, they have very limited offerings and don't have the proper resources to help users migrate to next-generation networks. Case in point: The industry is evolving toward converged networks — the ability to run voice, video and data over the same infrastructure. Full-spectrum equipment providers had the resources to identify and act on this trend several years ago, and planned their product, service and support strategies to accommodate this evolution. As a result, only full-spectrum vendors can offer a comprehensive, safe and smooth migration to next-generation networks.

It's an understatement to say that the health of your network is critical to your company's success. Plan for the long term, and think long and hard about the LAN vendors you select. In today's high-speed business world, short-sightedness can lead you into a large ent.

Gottlieb is 3Com's vice president of large enterprise systems marketing. He can be reached at andy.gottlieb@3com.com.

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Buyer's Guide

A MARKET DIVIDED

BY JOEL SNYDER

Business is booming for virtual private network (VPN) vendors. Every week, it seems, we receive word of a new product to add to our VPN watch list. Unfortunately, though, the VPN market is as fragmented as it is populated. While you'll have no trouble finding products to encrypt traffic and build private networks, there's no single solution that will solve all your problems—linking remote users to corporate LANs, building secure tunnels to branch offices and trading partners over the Internet, and encrypting sensitive internal traffic.

The bulk of the VPN market is focused on tunneling and encryption. Other features, such as quality of service, which might make sense for vendors to build into a VPN package, are generally not bundled with them. This makes life harder for network managers who want to build a true private network, but easier and less expensive for those who need just one feature, such as encryption.

Without universal agreement on how to build VPNs, vendors have divided into three camps based on Layers 2, 3 and 4 of the seven-layer OSI reference model. We've sorted out many of the details, including price, in our interactive buyer's guide (www.nwfusion.com, DocFinder: 2825). We'll continue to update this online resource, containing information on more than 50 products.

At the lowest level, Layer 2 VPNs encapsulate IP protocols as well as non-IP protocols, such as IPX and AppleTalk. They also provide platform independence because client systems typically don't require special software or hardware other than a dial-in networking adapter. However, Layer 2 VPN technology is aimed at the remote telecommuter, not the branch office, and lacks the flexibility that some LAN-to-LAN managers need.

Layer 2 VPNs include products based

VPN products run the gamut from simple encryption devices to multiprotocol tunnels. One commonality is a lack of management finesse.



on the older protocols, Layer 2 Forwarding (L2F) and Point-to-Point Tunneling Protocol (PPTP), as well as the new standard that replaces them both, Layer 2 Tunneling Protocol (L2TP).

We expect to see growth in this segment as the Cisco and 3Coms of the world sell L2TP products to ISPs and phone companies, but little of the growth in Layer 2 VPN sales will come from the corporate side. Enterprise network managers will instead spend their money on maturing Layer 3 VPN technology for branch-to-branch and extranet networking.

While Layer 2 products encapsulate all protocols in IP, Layer 3 products encapsulate IP in IP. The Layer 3 VPN market today revolves around IP Security (IPSec), the IP encryption, authentication and tunneling protocol standardized by the Internet Engineering Task Force. Earlier encryption and key exchange standards, such as Sun's SKIP, are being replaced by IETF versions. Products based on IETF standards benefit from a rigorous peer review by the best minds in the business, which is particularly important when it comes to encryption, the cornerstone of these VPN products.

Standardized IPSec VPNs also provide the ability to mix and match vendors. In theory, you can choose client software for PCs, Macs, and Unix systems, branch office VPN hardware, and central site VPN hardware from different sources, playing on the strengths of each vendor. Our first-hand interoperability tests, however, suggest that you can't take vendors' claims of interoperability for granted ([see graphic, page 92](#)).

Like their lower-layer brethren, Layer 4 VPN tools are basically encapsulating encryptors. However, products at this level are often tied to a single application, such as e-mail. Common implementations, such as HTTP over Secure Sockets Layer, are present in every browser—Type [https://](#) and you're using a Layer 4 VPN. Encrypted e-mail, or Simple Mail Transfer Protocol over Transport Layer

Inside

Review: In our tests of 15 VPN products, Radguard's cPro System 3.30 won the Blue Ribbon Award for its unbeatable inter operability and competitive speeds.

Page 86.

Interoperability on trial: Which products really work with each other? **Page 92.**

Choosing a VPN product: Don't forget management and reporting capabilities when you're shopping for VPN vendors. **Page 92.**

Online

Interactive Buyer's Guide: It's not easy keeping track of which vendors have what features in the explosive VPN market. We've done the leg work for you and collected product specs from 32 VPN vendors. Find the ones that can satisfy your security needs, management desires and budget restrictions. www.nwfusion.com, DocFinder: 2825.

3Com
Altiqa Networks
Ascend
Assured Digital
Axent Technologies
Check Point Software
Cisco
Compaq
Compatible Systems
Cybernetica
Data Fellows
E Lock Technologies
FreeGate
Fortress Technologies
IBM
Intel

Internet Devices
Internet Dynamics
Lucent
Microsoft
NetScreen Technologies
Norman Data Defense Systems
Nortel Networks
Novell

Radguard
RedCreek Communications
Secure Computing
Sonic Systems
Technologic
TimeStep
VPNet Technologies
WatchGuard Technologies

Security, and encrypted shell using the semi-proprietary Secure Shell protocols are continuing to spread.

With commodities come choices

But the bulk of the VPN market is the Layer 3 products. They're everywhere, packaged in routers, firewalls, software, and dedicated hardware. And though VPN standards and implementations are complex, this complexity is hidden from the network manager, leaving little evidence to differentiate products, even across different platforms.

The most obvious distinction among VPN products is in the management interface. Right now, management utilities are the weakest part of Layer 3 VPN products. Most vendors require you to handle each VPN device separately, which is OK when you have two sites to connect, but impossible when you have 200.

Vendors such as Internet Dynamics' VPNet and Check Point Software offer good tools that allow you to manage multiple VPN sites from a single management domain. Similarly, the ability to handle hundreds or thousands of remote users gives vendors such as Intel and Microsoft a chance to shine. We expect to see more vendors catching on and better management tools beginning to appear over the next year.

Layer 3 VPNs are inherently simple, which makes it difficult to add bells and whistles. While IP compression — which is a standardized way of compressing IP traffic before the encryption scrambles it — would seem to be important, it hasn't become a universal feature. About one-third of the products included in our online features chart support compression.

Other additional features are rare. Newcomer Network Alchemy (whose products don't ship until June, when they will be added to our online chart) is the only vendor we surveyed that includes load sharing and clustering in its VPN products.

One reason for this shortage of distinguishing features might be due to the large number of VPN vendors. Staff competition is driving product managers to

Reader RFP gets results

Last month, we asked readers interested in building a virtual private network (VPN) to send in their requests for proposal (RFP). Theresa Brummett from Powell Electrical Manufacturing Co. was selected to have her RFP answered by our VPN Buyer's Guide vendors. Brummett has been charged with swapping out her 400-person company's remote access server for a brand-new VPN.

Brummett has several requirements for her new VPN: central management, fault tolerance, 99% uptime, secure authorization and comprehensive logging.

To find out what our Buyer's Guide vendors recommend, head online to Network World Fusion's RFP Chart. You'll find Brummett's RFP her network diagram and detailed vendor responses, including products and pricing, from the likes of Intel, Microsoft, RedCreek and Radguard. Feel free to add your two cents.

Could your Web servers use some load balancing? If so, let us get some answers for you from our Web server load balancing Buyer's Guide vendors. Send your RFP to sg1tden@nwfusion.com.



push sales rather than spend resources on major product upgrades.

On the plus side, the increasing number of products has put a great deal of downward pressure on prices. Some hardware-based vendors, such as Intel, Nortel Networks, Lucent, and VPNet, have opted to use largely off-the-shelf PC hardware as the core for their products, in order to cut design costs and decrease the time it takes to get a product to market.

Ultimately, though, we think hardware vendors who

have taken the time to design their own equipment, such as Radguard, RedCreek and TimeStep, will have the advantage in a price war. Once the design process is complete, production is less expensive because these vendors aren't paying for unnecessary parts.

You might think software-based VPN vendors would have huge profit margins. However, network managers are well aware of the additional money they'll have to spend for an NT server to house a software VPN from Check Point, Data Fellows or Axent, for example. This ancillary expense makes it impossible for software-based VPN vendors to corner the VPN market.

Where's the infrastructure?

One of the key pieces still missing in the VPN market is a true public-key infrastructure (PKI). With a global PKI, users can have secure communications without requiring a special pre-established relationship. For example, with PKI, users could send securely encrypted e-mail by knowing each other's address and little else. Without a PKI, real Internet VPNs are going to be limited to company-specific solutions. Even within a single company, building a trusted PKI to support thousands of users is a major task.

Some VPN vendors, such as TimeStep and Check Point, understand the importance of a PKI in large VPN implementations; their products ship with a PKI. Microsoft, too, has quietly added PKI components to its Windows NT and Back Office products. (More than a certificate authority, a PKI also includes other pieces such as key request managers. See story online at www.nwfusion.com, DocFinder: 2826.)

It's clear that Layer 3 VPN products are here in force, and organizations are learning that they can easily and inexpensively add military grade encryption to their IP traffic. However, weak interoperability, few distinguishing features, and the lack of a PKI make adopting any vendor's VPN risky business. Despite the commodity nature of some of the products, building VPNs is still an adventure. □

VPNs: FAST, NOT FRIENDLY

BY JOEL SNYDER



Want to use the Internet as your corporate WAN, but you're worried about security? Don't be. We tested 15 virtual private network (VPN) products and found that all provide solid security for your company's Internet-based transmissions.

But be prepared to make some tough choices, because no one product aced our performance, interoperability and management tests. If you're a performance fiend, VPNet's VPNware VSU-1100 2.51 and 3Com's PathBuilder 5580 will knock your socks off. Have to mix and match multiple vendors' gear? Radguard's cIPro System 3.30 is as compatible as it gets in the proprietary world of VPNs. If management is your concern, Internet Dynamics' Conclave 1.52 is far ahead of the pack, though it has a lot of ground to gain in the interoperability race. If price is your top priority, RedCreek's Ravlin 10/5/30 3.0.2 may be the place to start.

But wait — there's more. Want a combined VPN and firewall? We tested five. Want a software-only solution? Just pick your platform: NT, Windows or Unix.

We know it's not easy to narrow a field that's this wide. It took nearly six weeks of testing for us to deter-

The fastest VPN products aced our performance tests, but VPN device compatibility gets mixed grades.

mine our top picks. In the end, Radguard's cIPro earned our Blue Ribbon Award. An all-around contender, cIPro set the bar for interoperability, which was a major obstacle for many vendors. While its management features are not outstanding, cIPro turned in near-top speeds and proved more flexible than most of the VPN products we tested.

We found three devices that deserve honorable mentions. Placing a close second to cIPro in our Score Card was VPNet's VPNware. Among the top three in our performance tests, VPNware delivers solid management features, better-than-average interoperability and good flexibility.

Also praiseworthy are Check Point Software's VPN-1 Gateway Solution with VPN-1 Accelerator Card and RedCreek's Ravlin, an affordable, interoperable product held back only by its average performance.

Our testing focused on site-to-site VPN products used to connect private LANs over an insecure network, such as the Internet. In a future test, we'll look at client-to-site VPN products that help secure the connection from a single low-speed system, such as a PC dialing into the Internet, to a corporate LAN.

Most of the products we tested are VPN devices with minimal firewall features. We'll find more complex firewall technology with VPN features in some products, such as Intel's LanRouter VPN Gateway 6.6 and Lucent's VPN Gateway 2.0.A few products,

Product: cIPro System 3.30

Vendor: Radguard

Top-notch interoperability and top-tier speeds secured the Blue Ribbon win for Radguard's cIPro System 3.30



Including Internet Dynamics' Conclave, Check Point's VPN-1 Gateway and Axent's Raptor Firewall/VPN Server, are firewalls at the core with VPN features added. 3Com's new PathBuilder is really a router with built-in VPN hardware assets. And Microsoft and Novell have added VPN features to their existing operating systems.



How often do
the phones crash?
(Still think your
datacom is reliable?)

When it comes to mission critical services, Ericsson has been developing and implementing carrier-class switching systems longer than anyone. It's this experience we're now bringing to bear on datacom – in the shape of a new high-performance ATM switch.

You'll be hard pressed to find a more reliable switch than the AXD 301. With full system redundancy and in-service upgrade and expansion, your network will simply not go down.

It's also the most scalable ATM switch around – the AXD 301 is designed to scale from 10 Gbps to 160 Gbps. You can standardize all your switching needs on one system – from the massive core switch to the smallest node. With the AXD 301 you 'pay as you grow'.

And naturally it comes with complete ATM functionality, voice capability and a smart way to run IP traffic, making it ideal for the latest multi-service networks.

Which all goes to explain why, when large carriers pick up the phone to order large ATM networks, they're now calling Ericsson.

Net Results



ciPro System 3.30
Radguard
(201) 829-3611
www.radguard.com/products.html
\$6,450

- Pros**
- ▲ Small form factor
 - ▲ Good price/performance ratio
 - ▲ Centralized management interface
- Cons**
- ▼ Initial key distribution is somewhat awkward
 - ▼ Requires dedicated management station and certificate authority

VPNware VSU-1100 2.51
VPNnet Technologies
(408) 445-6600
www.vpnnet.com/products/products.htm
\$17,995

- Pros**
- ▲ High performance
 - ▲ Nicely unified management
- Cons**
- ▼ High price

VPN-1 Gateway Solution with VPN-1 Accelerator Card
Check Point Software Technologies
(650) 628-2000
www.checkpoint.com/products/vpn1/gateway.html
\$3,495 plus \$3,995 for accelerator

- Pros**
- ▲ Integrated with firewall
 - ▲ Unified management interface
 - ▲ Hardware acceleration available
- Cons**
- ▼ Requires additional hardware and OS configuration
 - ▼ Difficult to do VPN-only configuration

Ravlin 10/5100 3.0.2
RedCreek Communications
(888) 445-3900
www.redcreek.com/products/rav10.html
\$3,500

- Pros**
- ▲ Elegant form factor
 - ▲ Simple GUI and configuration
 - ▲ Very good IPSec feature set
 - ▲ Excellent price/performance ratio
- Cons**
- ▼ Limited to near T-1 encryption speeds

TimeStep Permit Gateway 4520
TimeStep
(800) 383-8211
www timestep.com/Html/ProdConGata.htm
\$5,495

- Pros**
- ▲ Elegant form factor
 - ▲ Excellent PKI integration
 - ▲ Good management interface
- Cons**
- ▼ Limited to near T-1 encryption speeds
 - ▼ Poor price/performance ratio

F-Secure VPN+ 4.0
Data Fellows
(800) 938-6700
www.datafellows.com/f-secure/vpn-plus/
\$2,495

- Pros**
- ▲ Uses off-the-shelf hardware
 - ▲ Integrates with Windows NT Security Account Manager
- Cons**
- ▼ Requires additional hardware and OS configuration
 - ▼ Complex management utility is difficult to set up and use

Contivity Extranet Switch 1500 2.0
Nortel Networks
(800) 466-7835
www.nortelnetworks.com/products/
\$7,000

- Pros**
- ▲ Easy to configure single units with Web browser
- Cons**
- ▼ Unit-by-unit management is slow and difficult to use

Raptor Firewall/VPN Server
Axent Technologies
(301) 258-5043
www.axent.com/product/rsbu/firewall/default.htm
\$2,900

- Pros**
- ▲ Integrated with firewall
 - ▲ Unified management interface
- Cons**
- ▼ Requires additional hardware and OS configuration
 - ▼ Difficult to do VPN-only configuration
 - ▼ Unit-by-unit management is difficult

VPN Gateway 2.0 with Encryption Accelerator Card
Lucent
(888) 552-2544
www.lucent.com/security
\$9,995 plus \$3,495 for accelerator

- Pros**
- ▲ Includes firewall capabilities
 - ▲ Optional hardware acceleration
- Cons**
- ▼ Difficult management interface

Continued on page 90

A tough lesson in interoperability

We take interoperability for granted with most products, but VPNs are another story. As enterprises build huge VPNs, they'll quickly discover that no one vendor has a good solution for all environments and that multi-vendor interoperability is key to a successful deployment. Vendors who come to this realization as well will prosper; those who don't will wither.

Our interoperability tests were no small undertaking. As the number of boxes in the lab increased, interoperability testing took longer and longer. It took nearly two full days for us to test the final product against all the other vendors' products.

While results could vary wildly depending on the profiles and products tested, one thing our tests showed clearly was that universal interoperability is by no means a given (see graphic, page 92). In part, poor interoperability exists because vendors have not had many opportunities to test their products with each other — and because the product marketing managers would rather you bought everything from one source. Even the best product in our interoperability tests, Radguard's ciPro, worked with only a small subset of the other vendors' gear. The reason it scored well is because it works better than any other product we tested. We scored the products relative to each other, not against a perfect-world benchmark.

NETWORKLINTEROP 99

Check this out if you're at N+1: Network World Test Alliance member Joel Snyder is coordinating live virtual private network (VPN) interoperability demos for InteropNet Labs in the convention center's main lobby. After six weeks of testing VPN products for this Network World Buyer's Guide, he's a pro. Stop by and see for yourself which products really work with each other.

Admittedly, our interoperability tests were particularly harsh. We required vendors to support Data Encryption Standard (DES), Triple-DES encryption algorithms and IPsec (IPSec), with its Internet Key Exchange (IKE) protocol. Our goal was to verify that different vendors' products could talk to each other using a common profile, which was a real impediment for some. For example, Intel's LanRouter product wouldn't talk to any other products using our selected profile, but it did reasonably well in a simpler fallback test.

Radguard's ciPro, VPNnet's VPNware, and Data Fellows' F-Secure VPN+ 4.0 all scored well for interoperability because of their extensive logging and analysis features. This isn't interoperability per se; however, because these devices provided good logging facilities, we were able to get them up and running with more products. Rather than return a cryptic error message — "invalid payload" was about all we got out of the TimeStep Permit Gateway 4520 no matter what we tried — these products reported a great deal of detail about what they saw and what they were expecting. If every vendor offered the quality of logging that Data Fellows does, our testing would have been a lot easier.

Flexibility helped other products talk to more systems. RedCreek's and Nortel's gear interoperated with a surprising number of products with a surprisingly small amount of tweaking.

For some products, no amount of tweaking helped. Internet Dynamics, Microsoft and Novell failed our interoperability tests because they currently don't support the security protocols we required. (Lucent is not part of our interoperability matrix. It took nearly two days for us to get Lucent's VPN Gateway 2.0 up and running, despite having a Lucent technician on site. Because of this delay, we were unable to perform interoperability testing with the Lucent VPN Gateway.)

Private tests, such as those run by the International

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Computer Security Association, generally show more encouraging results than we found in our lab. But those tests usually have product developers from both sides in attendance and allow a full week for the experts to talk to each other. Our tests present a more typical customer picture because we had one vendor representative — usually a field engineer, not a developer — available to configure products in just a few hours. Having a vendor's representative on site was invaluable because we often had to tweak hidden variables or debug parameters on each device.

Our tests were also more generous because we only required one-to-one interoperability — we required each product to talk to each other product but only one at a time. Based on what we saw, true multivendor interoperability won't be as successful. For example, Radguard was able to get high marks by turning on and off the sending of vendor ID, a fairly new feature in the IPsec negotiations. But this feature is per system, not per tunnel. This means that Radguard cPro might not have been able to interoperate with as many vendors simultaneously as it could on a one-by-one basis.

Speed for sale

We asked our vendors to perform Triple-DES encryption in our performance tests for two reasons. First, Triple-DES offers military-grade security. No one has successfully cracked a data stream encrypted with Triple-DES. Second, there are readily available hardware accelerators for Triple-DES encryption. Other algorithms commonly supported in VPN systems, including Blowfish, CAST and RC5, may be as secure as Triple-DES, but can't be accelerated with commonly available hardware tools.

Encryption is compute-intensive. We were amazed that Xcent managed to pump out 8.3M bit/sec on a standard 350 MHz Pentium II system — and that was slow compared with Lucent's 30.2M bit/sec on a hardware-accelerated 300 MHz Pentium II.

Products tested with and without acceleration showed dramatic differences: Intel's Pentium-based LanRover VPN Gateway jumped from 2.7M bit/sec to 8.9M bit/sec, and Check Point's VPN-1 Gateway went from 6M bit/sec on a standard Sun Sparc 20 Workstation to 23.1M bit/sec when we enabled the vendor's VPN-1 Accelerator Card.

In general, if you need speed, bring money. That's

the lesson we learned from the superfast products we tested: VPNet's VPNware and 3Com's PathBuilder blew us out of the water. We don't really know how fast

they can go, except that they pegged the meter on our test bed. Both turned in a blistering 60M+ bit/sec of multistream Triple-DES encryption on a 100M bit/sec

Net Results continued from page 88

LanRover VPN Gateway 6.6

Intel
(800) 377-4482
www.shiva.com/remoted/vpnpage/index.html
\$6,200

Pros
▲ Good integration with remote authentication system for telecommuters and remote access users

Cons
▼ Very large form factor
▼ Difficult debugging facilities

PathBuilder S580

3Com
(800) 638-3266
www.3com.com/products/dsheets/400428.html
\$29,500

Pros
▲ High performance
▲ Excellent form factor

Cons
▼ Horrible command-line interface

Conclave 1.52

Internet Dynamics
(805) 370-2200
www.conclave.com
\$2,495

Pros
▲ Elegant management interface
▲ Includes policy-based firewall

Cons
▼ Runs on Windows NT, which hurts performance
▼ Not IKE-compliant

BorderManager Firewall Services 3

Novell
(801) 228-4272
www.novell.com/catalog/q/sne34196.html
\$395

Pros
▲ Integrated with NetWare

Cons
▼ Does not support IKE

IntraPort 2+

Compatible Systems
(800) 356-0263
www.compatible.com
\$9,995

Pros
▲ Multiprotocol routing

Cons
▼ Not interoperable
▼ Per-client rather than per-tunnel pricing

Routing and Remote Access Service

Microsoft
(425) 882-8080
www.microsoft.com/intserver/default.asp
Bundled with Windows NT Server

Pros
▲ No cost on top of existing NT servers
▲ Integrates with Windows NT Security Account Manager
▲ Supports built-in client in existing Windows systems

Cons
▼ Only supports RC4 encryption and PPTP
▼ No support for non-Windows platforms

Internet World



ScoreCard

	Interoperability 25%	Management 25%	Performance 20%	Flexibility 20%	Documentation 10%	Total score
Radguard cPro System 3.30	9 x .25 = 2.25	6 x .25 = 1.50	9 x .20 = 1.80	9 x .20 = 1.80	6 x .10 = 0.60	7.95
VPNNet VPNware VSN-1100 2.51	7 x .25 = 1.75	7 x .25 = 1.75	10 x .20 = 2.00	8 x .20 = 1.60	6 x .10 = 0.60	7.70
Check Point VPN-1 Gateway	6 x .25 = 1.50	7 x .25 = 1.75	8 x .20 = 1.60	8 x .20 = 1.60	6 x .10 = 0.60	7.05
RedCreek Ravlin 10/5100 3.0.2	9 x .25 = 2.25	6 x .25 = 1.50	5 x .20 = 1.00	8 x .20 = 1.60	7 x .10 = 0.70	7.05
TimeStep Permit Gateway 4520	5 x .25 = 1.25	6 x .25 = 1.50	5 x .20 = 1.00	10 x .20 = 2.00	7 x .10 = 0.70	6.45
Data Fellows F-Secure VPN+ 4.0	9 x .25 = 2.25	3 x .25 = 0.75	6 x .20 = 1.20	6 x .20 = 1.60	6 x .10 = 0.60	6.40
Nortel Contivity Extranet Switch 1500 2.0	7 x .25 = 1.75	4 x .25 = 1.00	7 x .20 = 1.40	8 x .20 = 1.60	6 x .10 = 0.60	6.35
Axent Raptor Firewall/VPN Server	6 x .25 = 1.50	4 x .25 = 1.00	6 x .20 = 1.20	9 x .20 = 1.80	7 x .10 = 0.70	6.20
Lucent VPN Gateway 2.0	5 x .25 = 1.25*	4 x .25 = 1.00	8 x .20 = 1.60	9 x .20 = 1.80	4 x .10 = 0.40	6.05
Intel LanRover VPN Gateway 6.6	5 x .25 = 1.25	6 x .25 = 1.50	6 x .20 = 1.20	8 x .20 = 1.60	4 x .10 = 0.40	5.95
3Com PathBuilder S580	5 x .25 = 1.25	2 x .25 = 0.50	10 x .20 = 2.00	6 x .20 = 1.20	7 x .10 = 0.70	5.65
Internet Dynamics Conclave 1.52	1 x .25 = 0.25	9 x .25 = 2.25	5 x .20 = 1.00	6 x .20 = 1.20	7 x .10 = 0.70	5.40
Novell BorderManager Firewall Services 3	1 x .25 = 0.25	4 x .25 = 1.00	4 x .20 = 0.80	6 x .20 = 1.20	4 x .10 = 0.40	3.65
Compatible Systems IntraPort 2+	1 x .25 = 0.25	2 x .25 = 0.50	6 x .20 = 1.20	6 x .20 = 1.20	4 x .10 = 0.40	3.55
Microsoft Routing and Remote Access Service	1 x .25 = 0.25	4 x .25 = 1.00	5 x .20 = 1.00	4 x .20 = 0.80	5 x .10 = 0.50	3.55

* We did not test interoperability for Lucent. 5 is the average interoperability score for the other 14 vendors.

Individual category scores are based on a scale of 1 to 10. Percentages are the weight given each category in determining the total score.

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LAN with real world traffic. But both vendors want more than \$16,000 per LAN.

Unfortunately, VPNs put IP at a disadvantage. The additional overhead of a VPN increases the size of IP packets. This causes packet fragmentation, which means that network resources are used inefficiently. Encryption also increases latency, which reduces overall throughput. Our performance numbers in multi-stream tests represent the best throughput available in a low-latency, zero-loss Internet with real-world software at both ends.

Even on this almost ideal Internet, adding encryption cost us almost 30M bit/sec compared with our no-encryption baseline. If you put a VPN into your network, be prepared to see a lot of bandwidth disappear. If you want to add VPN capabilities to an existing firewall or server, performance is a major concern. Encrypting a T1 link will eat up most of the processing power of an existing Pentium-based firewall, so go for hardware encryption or a dedicated server if you anticipate a significant amount of traffic. Radguard delivers the bandwidth bargain — you get hardware encryption at the lowest price-per-megabit we found.

We tested IP compression with Nortel's Contivity Extrant Switch 1500 2.0 and VPNet's VPNware. IP compression helps to combat the ill effects of VPN packet explosion. Because of the scrambling effect of encryption on data streams, products must apply compression before the data is encrypted, either at the application level or in the VPN itself. Link-based encryption yields no performance increase.

When we tested Nortel's Contivity switch with compression turned on, multi-stream performance jumped from 11.9M bit/sec to 26.7M bit/sec on our easily compressible data stream. However, VPNet displayed different results: Compression dropped performance from a chart-topping 60M bit/sec down to 48.5M bit/sec. We suspect that this performance loss is because of the overhead involved in shipping packets between specialized hardware encryptors and the general purpose CPU.

Interoperability on trial

	3Com	Axent	Check Point	Compatible Systems	Data Fellows	Intel	Nortel	Radguard	RedCreek	TimeStep	VPNet
3Com	●	●	●	●	●	●	●	●	●	●	●
Axent	●	●	●	●	●	●	●	●	●	●	●
Check Point	●	●	●	●	●	●	●	●	●	●	●
Compatible Systems	●	●	●	●	●	●	●	●	●	●	●
Data Fellows	●	●	●	●	●	●	●	●	●	●	●
Intel	●	●	●	●	●	●	●	●	●	●	●
Nortel	●	●	●	●	●	●	●	●	●	●	●
Radguard	●	●	●	●	●	●	●	●	●	●	●
RedCreek	●	●	●	●	●	●	●	●	●	●	●
TimeStep	●	●	●	●	●	●	●	●	●	●	●
VPNet	●	●	●	●	●	●	●	●	●	●	●
● Not interoperable											
● Partially interoperable											
● Interoperable											

For more details on partially interoperable pairs, see our online interoperability matrix (www.nwfusion.com, DocFinder: 2822).

The products we tested from Internet Dynamics, Microsoft and Novell are not IKE-compliant and were not compatible with the other products we tested. We were not able to test compatibility with Lucent's VPN Gateway 2.0 because of scheduling delays.

Management: The weakest link

We found the biggest differences in the products we tested to be in their management systems. With a couple of exceptions, the vendors have a long way to go in this category.

Most vendors treat each VPN box as a separate, and separately managed, entity. Because VPNs are almost always used in pairs, this makes no sense to us.

The worst offenders were 3Com and Compatible Systems. Both use a per-device command-line interface that was often overly hostile. (Compatible Systems also has a graphical user interface, but the current release of the VPN code was not in sync with the current GUI. For example, the GUI we had couldn't be used to build VPN tunnels between devices.)

Axent and Nortel also failed to impress us with the management of their respective Raptor and Contivity

products. Their devices require a completely separate GUI, and there's no way to share configuration information between two different systems. Data Fellows crafted a uniquely confusing management system, requiring no less than three different GUIs and one out-of-band secure channel to keep its boxes running.

RedCreek, Radguard, and TimeStep do a better job of making the network manager's life easier. Although they treat each box as a separately managed entity, you can look at multiple boxes simultaneously to synchronize configurations and share common information. We could put up with their management GUIs for a small number of tunnels.

Check Point, VPNet and Internet Dynamics are the only vendors that help network managers work with a VPN as a tunnel, not as two disjoint end points. Among these, Internet Dynamics' Conclave was the real win-

HOW TO CHOOSE THE RIGHT VPN PRODUCT

When selecting virtual private network (VPN) devices, think first about your existing equipment. If you want to integrate your VPN with your 3Com router network or your Axent firewalls, for example, your choice is pretty easy.

Adding on to an existing device, though, is not always wise. If your firewall or router is already bogged down with existing tasks, assigning VPN service to it will probably push it over the edge.

Consider your management workload. If you plan to use the VPN for client-to-LAN as well as LAN-to-LAN encryption, the product's ability to manage thousands of VPN tunnels is critical. Generally, we found that the software-only vendors, including Microsoft, Novell, Internet Dynamics, Axent and Data Fellows, offer a more limited feature set and less control than their hardware-based competitors.

However, if you're constrained by a tight budget, the software-only vendors make a compelling cost argument if you have an available server. And all could easily keep up with a T1 circuit on our 350-MHz PII systems, even using the highest available level of encryption.

If you haven't settled on a vendor yet, it's time to consider other features.

- **Selective encryption.** Some products allow you to decide whether or not to encrypt traffic based on the service being accessed. Not every organization cares, but if you're trying to add a VPN to an existing firewall, you may want to encrypt only a subset of traffic. Or, you may want to apply a tougher encryption algorithm to packets going to the human resources system than to GIFs coming off the corporate Web server.

- **Topology.** Most hardware VPN products ship with a pair of 10M bit/sec or 10/100M bit/sec Ethernet interfaces. Software vendors are often more generous with LAN interfaces because they can depend on Windows NT, NetWare or Unix to handle LAN and WAN interfaces (although the CPU may not be able to handle the load of even two). Some hardware vendors, including 3Com, Lucent and Radguard, also offer more than two LAN interfaces on their products.

- **Certificate authority support.** The ability to work with a certificate authority, provided either by the VPN vendor or a third party such as Entrust Technologies' Entrust/PKI, is key if you think you'll

be managing more than a handful of tunnels and clients. We tested only three products — TimeStep's Permit Gateway 4520, Axent's Raptor Firewall/VPN Server and Check Point Software's VPN-1 Gateway — that could handle online connections to our Entrust PKI.

- **Logging.** Once you've come up with a short list of products that fit, look at logging features. If you have a centralized logging facility, will your VPN integrate with it? What about SNMP? There is no defined VPN Management Information Base, but just being able to count packets with an SNMP management station can tell you a lot about the health of your VPN.

- **Management modules.** Management stations are more than decision points — they can be budget busters. For example, Lucent's hardware is downright affordable, until you realize that you have to shell out an extra \$12,000 for the management station. If you're going to be linking only two or three sites, vendors such as VPNet, Radguard, Lucent and Check Point make you pay a high premium to set up their management infrastructure.

— Joel Snyder

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ner. Conclave, a combined firewall and VPN, lets the network manager think in terms of policies: How secure do you want the traffic going from here to there? Once you explain the policy you want, Conclave determines how to build a VPN between your systems to yield the desired security. And if it can't give you the security your policy requires, Conclave doesn't let the

traffic move. Internet Dynamics' management interface stands head and shoulders above the others.

Because of the complexity of encryption and VPN configuration, good documentation is crucial to making informed decisions. Simple misconceptions about key terms could leave your data entirely exposed.

We have the usual complaints about product docu-

mentation. Vendors are using the online documentation trend as an excuse to do little more than provide online help for their GUI. However, some stood out with good hard copy and on-line documentation. Time-Step, for example, provides a white paper on VPN security that contains one of the most lucid explanations of IP-sec we've ever read. It's worth looking at Time-Step's product just to read the tutorial. At the other end of the spectrum were: Novell and Compatible Systems, whose documentation stopped just short of being worse than nothing. There are many fac-



- How we did it.
- A chance to chat with Joel Snyder.
- Interoperability testing details.
- Advice from VPN adopters.



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tors to consider before settling on a VPN strategy. Among them are compatibility with existing equipment, management workloads and extra features (see "How to choose the right VPN product," page 92). We suggest that you take the time to test prospective products before you buy. Security is just the beginning.

Snyder is a senior partner with Opus One, a consulting firm in Tucson, Ariz., specializing in e-mail, security and networking. He travels the world helping people build bigger, faster, safer and more reliable networks. He can be reached at joel.snyder@opus1.com.





Snyder is also a member of the Network World Test Alliance, a cooperative of the premier reviewers in the network industry, each bringing to bear years of practical experience on every review. For more Test Alliance information, including what it takes to become a member, go to www.nwffusion.com/alliance.

Performance

	Multistream (in M bit/sec)	Single stream (in M bit/sec)
3Com PathBuilder S500	61.3	10.3
VPNet VPNware VSU-1100 2.51	60.0	21.0
Lucent VPN Gateway 2.0*	30.2	8.1
Radguard cPro System 3.30	28.6	18.0
Check Point VPN-1 Gateway*	23.1	12.4
Nortel Contivity Extranet Switch 1500 2.0	11.9	6.7
Intel LanRover VPN Gateway 6.6*	8.9	3.5
Axent Reptor Firewall/VPN Server**	8.3	6.1
Compatible Systems IntraPort 2+	7.2	2.5
Microsoft Routing and Remote Access Service**	6.2	2.1
TimeStep Permit Gateway 4520	5.1	2.0
Data Fellows F-Secure VPN+ 4.0*	5.1	4.6
Internet Dynamics Conclave 1.52**	4.2	3.4
RedCreek Ravlin 10/5100 3.0.2	3.7	3.0
Novell BorderManager Firewall Services 3	3.0	2.1

* With accelerator

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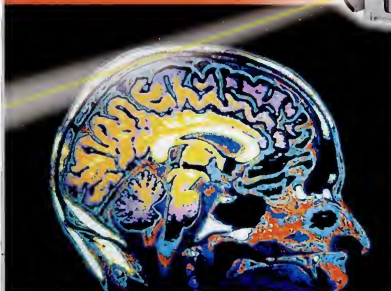


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Feature

CROWNING OUR NEW SWITCH LEADERS

3Com, Foundry and HP are the price/performance kings in the first round of Network World/Tolly Group 1999 SwitchMetric testing.

BY CHARLES BRUNO AND KEVIN TOLLY

The spin doctors at network switch companies spend countless hours devising stories that they hope will position their switches as cost-per-port leaders, throughput champions and standard bearers. These folks are good at what they do, making it all that much tougher for you to weed through their claims and make informed buying decisions.

To give you at least one independent point of comparison when evaluating switches, The Tolly Group and *Network World* devised a benchmark that makes it easy to see which vendors have the best price/performance ratio in the switching business.

In the inaugural 1999 SwitchMetric, we benchmarked 15 products — seven Gigabit Ethernet switches, six Fast Ethernet switches and a pair of token-ring switches — from nine vendors. Using a state-of-the-art, \$1.35 million test bed featuring Netcom Systems' SmartBits Advanced Multiprot Performance Tester/Analyzer/Simulators (see story, page 98), The Tolly Group identified each switch's

best aggregate throughput. We then divided that figure by the manufacturer's suggested retail price, as provided by the vendor, for the switch configuration tested.

The result is a cost per gigabit of throughput, a new metric intended to help you determine the price you pay for each gigabit per second of throughput a switch provides. Think of it as analogous to the cost-per-MIPS metric used in benchmarking computer systems.

The 1999 SwitchMetric establishes a set of baseline results that we will build on over time. As we bring more switches into the lab and subject them to our benchmark, we'll continually add the results to our database. We will keep an online leaderboard up to date on Network World Fusion (www.nwfusion.com), and the full results database will be available from The Tolly Group at <http://switchcentral.tolly.com>. Results will be published in print at least a couple of times

each year, as well.

For this initial round, *Network World* and The Tolly Group invited every switch maker to the benchmarking party. Nine accepted and were able to deliver switches in time for this initial report. Ten more agreed in principle and promised to participate in later tests. Only Cisco outright declined.

Cisco executives argued that users are interested in more than simple price/performance numbers. We couldn't agree more, but we also know that price/performance is still an important consideration — albeit one of many. Our door is still open should Cisco change its mind.

The inclusion or absence of vendors, switch topologies and protocols tested is indicative of the state of the network market. Ollicom, for instance, was the only token-ring vendor to test in the initial round, underscoring the popularity of Ethernet-based switching. (You'll find the Ollicom results in our online charts. Based on its numbers, it appears token-ring switch vendors will have a tough time making the price/performance case vs. their Ethernet brethren.)

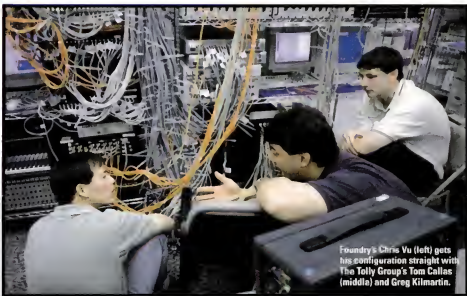
The results: Gigabit switches

For each type of switch, we gave vendors the option to participate in any or all of three basic tests — Layer 2, Layer 3 IP and Layer 3 IPX — depending on which markets they believe their products are best suited to serve. For each protocol, we conducted separate tests with frame sizes of 64, 512 and 1,518 bytes. The cost per gigabit of throughput results offered are derived from tests with 1,518-byte frames, which offer the least processing overhead of all frame sizes tested and thus should result in the highest throughput.

On the Gigabit Ethernet switch side, all switches offered between 12 and 64 ports and were configured

SwitchMetric Leaderboard

Switch type/test	Vendor/product	Cost per gigabit of throughput
Gigabit Ethernet — Layer 2		
	3Com SuperStack II Switch 5000	\$1,325
	3Com CoreBuilder 9400	\$1,764
	Foundry BigIron 4000	\$2,280
	Foundry BigIron 8000	\$2,413
	HP ProCurve Routing Switch 9308M	\$3,515
	HP ProCurve Routing Switch 9304M	\$3,531
Gigabit Ethernet — Layer 3 IP		
	Foundry BigIron 4000	\$2,280
	Foundry BigIron 8000	\$2,413
	HP ProCurve Routing Switch 9308M	\$3,515
	HP ProCurve Routing Switch 9304M	\$3,531
	Lucent P550 Cajun	\$4,288
Gigabit Ethernet — Layer 3 IPX		
	Foundry BigIron 4000	\$2,280
	Foundry BigIron 8000	\$2,413
	HP ProCurve Routing Switch 9308M	\$3,515
	HP ProCurve Routing Switch 9304M	\$3,531
Fast Ethernet — Layer 2 (no 10M or Gigabit links)		
	HP ProCurve Switch 4000M	\$956
	VIPswitch, Inc. VIPswitch 1600	\$2,496
	Cabletron SmartSwitch Router 2000	\$3,277



Foundry's Chris Vu (left) gets his configuration straight with The Tolly Group's Tom Callas (middle) and Greg Kimartin.

PHOTO BY JEFFREY M. HARRIS

in a fully meshed network design. Nearly all of the switches tested achieved wire-speed throughput at each frame size, although there were some exceptions, all of which are detailed in our online charts.

3Com's SuperStack II Switch 9300 and CoreBuilder 9400 proved to be the best value for Layer 2 Gigabit Ethernet switches, offering a cost per gigabit of throughput of \$1,325 and \$1,764, respectively, in the 1,518-byte test.

This is especially interesting in light of the fact that the 3Com switches were the only Gigabit Ethernet products that failed to deliver wire-speed throughput in 1,518-byte tests, with the 9300 at 94% of wire speed and the 9400 topping out at 85%. On the other hand, both devices did achieve wire-speed rates and exceptionally low cost-per-gigabit ratings in the 64- and 512-byte frame tests.

3Com officials point to an Ethernet clock tolerance issue as a possible reason why its switches failed to perform at wire speed for the 1,518-byte tests. In short, the clocks that drive a switch and the SmartBits traffic generator tool operate independently; if the switch clock is behind the SmartBits clock time, the test tool could transmit enough data to overwhelm a switch's buffers, causing packets to drop.

Foundry Networks' BigIron 4000, a 32-port Gigabit Ethernet campus switch, delivered the next best value in the Layer 2 tests at \$2,280 per gigabit of throughput using 1,518-byte frames. Foundry also delivered the best cost per gigabit of throughput for 64-port Gigabit

Ethernet switches, with a figure of \$2,413 for its BigIron 8000.

In the Layer 3 tests, however, Foundry bested the competition by a margin of more than \$1,000 for IP and IPX traffic. The BigIron 4000 and BigIron 8000 delivered cost per gigabit of throughput figures below \$2,500 in each test, whereas the closest competitor, the Hewlett-Packard ProCurve Routing Switch 9308M, came in at just over \$5,500 for IP and IPX.

The test results support the idea that many gigabit switches can unify subnetworks and perform as the routing point in the center of an enterprise network backbone. The simple fact that the majority of these devices offered wire-speed throughput indicates they are well-positioned at Layer 2 and Layer 3 to push routers further out to the network's edge. The ability to manage routing and switching from a single device should prove a cost-effective alternative to purpose-specific routers.

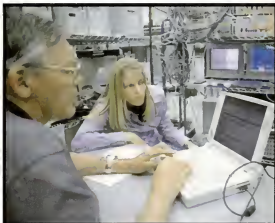
Fast Ethernet findings

On the Fast Ethernet side, TheTolly Group tested six devices with port densities ranging from eight to 84 ports. All were primarily workgroup-oriented switches, some were hybrid models with Gigabit Ethernet uplinks, some were pure Fast Ethernet, and others mixed Fast Ethernet and 10M bit/sec Ethernet. We derived a cost-per-gigabit figure by adding the total capacity and expressing it in a gigabit-per-second rate.

Among pure Fast Ethernet switches, HP's ProCurve Routing Switch 4000M delivered the lowest cost per gigabit of throughput at just \$956 for 1,518-byte frames in our Layer 2 test. And HP's ProCurve Switch 2424M, a 24-port Fast Ethernet switch with one Gigabit Ethernet uplink, delivered a cost per gigabit of throughput of \$1,195 — the lowest cost for any hybrid Fast Ethernet/ Gigabit Ethernet switch.

Note, though, that both HP switches stopped short of offering full wire-speed throughput. The 4000M delivered 94% of its theoretical maximum 4G bit/sec throughput, and the 2424M delivered just under 91% of its rated 3.4G bit/sec throughput.

Another interesting note is that the price/performance spread between Layer 2 and Layer 3 functionality on Cabletron's SmartSwitch Router 2000 is nil, indicating that some switch makers may no longer be charging a premium for Layer 3 functionality in Fast Ethernet switches. Aside from



Olicom's Jerry Harnden checks out results with Tolly Group engineer Elko Passarge.

More Online

Go online for more test results, including configuration details such as the maximum throughput of each switch tested.

Check back often — as we get more switches into the lab, we'll continue to update the SwitchMetric Leaderboard on Network World Fusion and post full results on The Tolly Group's SwitchCentral site. In September, we'll publish more test results in the pages of Network World.



www.nwfusion.com

Cabletron, no other vendor offered Layer 3 functionality in a Fast Ethernet switch, an indication that vendors that participated in this round of testing are committed to Fast Ethernet in the flattened edges of enterprise networks.

Going forward

While this first round of testing for the 1999 SwitchMetric provides a good deal of insight into the cost implications of Gigabit Ethernet and Fast Ethernet switches, the findings will become more valuable throughout the year as we test products from additional vendors and add those results to the mix. At an average cost per gigabit of throughput of \$2,840, Gigabit Ethernet switch vendors appear to have some work ahead to catch up with 3Com's \$1,325 minimum cost per gigabit of throughput at Layer 2.

Likewise, on the Fast Ethernet switch side, HP has set the price to beat with a cost per gigabit of throughput of \$956. Testing also demonstrated that the best cost per gigabit of throughput deals may not necessarily deliver wire-speed throughput, leaving users with an interesting choice between cost and performance.

The gauntlet has been thrown down. We invite any and all vendors to come into the lab and try to best 3Com, Foundry and HP, which we expect will be back to try to beat their best.

Bruno is managing editor of publishing products, and Tolly is president and CEO of The Tolly Group. They can be reached at cburno@tolly.com and ktolly@tolly.com.

THE METHOD BEHIND THE METRICS

To conduct the 1999 SwitchMetric tests, TheTolly Group connected each switch to a test bed outfitted with \$1.35 million worth of Netcom Systems equipment. The test bed was configured to determine each switch's full-mesh aggregate throughput — throughput with each port transmitting to and receiving data from every other port. This setup provided a maximum load, enabling us to determine a switch's throughput capability in a worst-case traffic scenario.

At the heart of the test bed were as many as six SmartBits Advanced Multiport Performance Tester/Analyzer/Simulators provided for the test by Netcom. The SmartBits devices were used to generate Layer 2 and Layer 3 IP and IPX traffic, as well as to receive data from the switches and record all results.

Engineers tested multiple vendor switches side by side, using five SmartBits test tool device stacks. Each stack comprised a mix of SmartBits gear: TheTolly Group used five SMB-2000 chassis-based testers and 15 smaller SMB-10s.

"This exercise demonstrates the ease with which you can configure multi-

ple SmartBits testers to act in concert on a large throughput test," says Tom Callas, the Tolly Group engineer who coordinated the testing.

The Tolly Group used Netcom's Xstream advanced switch test to conduct Layer 2 mesh testing. For Layer 3 IP testing of 10/100M bit/sec Ethernet switches, we used Netcom's LAN Advanced Switch Test. For Layer 3 IP tests of Gigabit Ethernet switches, engineers manually configured the test and SmartWindows, a Netcom application that enables users to manually craft a test and build their own traffic patterns. Likewise, all Layer 3 IPX testing was configured manually using SmartWindows.

Testing was conducted between March 16 and April 16.

— Charles Bruno



Tom Callas, The Tolly Group

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CACHE CACHET

BY NEAL WEINBERG

S your Internet connection getting bogged down? Are end users complaining about the World Wide Wait? Are you adding new Internet or intranet applications that may require additional bandwidth?

Maybe it's time to consider implementing a Web-caching appliance. These devices store a copy of previously accessed Web pages and eliminate the need to download those pages from the Internet the next time an end user requests them. By reducing Internet traffic and improving network performance, caching appliances may allow you to delay a costly Internet access upgrade.

ISPs buy the bulk of caching products these days, but analysts predict that corporate customers will begin turning to caching appliances later this year as they either outgrow their software-based proxy servers or look to caching for the first time in the face of mounting end-user complaints about slow Web response time.

"The market for caching will ultimately be huge," says Peter Christy, an analyst at Collaborative Research in Los Altos, Calif. He expects the market to grow from \$100 million in 1998 to \$2 billion by 2002, with caching appliances dominating the field.

However, caching appliances are expensive — a high-end box can cost \$100,000. And early adopters say that while caching helped them reduce Internet traffic, they still had to upgrade their Internet connections to accommodate exploding user demand.

"Caching is not magic," Christy says. "It doesn't mean all you'll ever need is a T-1 line."

Ray Smith, Internet services manager at IT consulting firm Computer Sciences Corp. (CSC), knows that only too well. Workers at CSC's 450 remote offices connect over the company's WAN to its central office in Falls Church, Va. From there, they access the Internet via three separate ISP connections that provide 9M bit/sec of total bandwidth.

However, bandwidth requests on the WAN were peaking at 18M bit/sec, so the Web traffic was dragging down the entire remote access network.

Smith deployed two CacheFlow appliances from CacheFlow, along with an ACDirector Layer 4 switch

Web caching appliances help conserve precious Internet bandwidth.

from Alcon WebSystems. The switch intercepts all HTTP traffic and redirects it to the cache, reducing the load on the company's remote access router and improving overall WAN performance.

The appliances also reduced the amount of Internet traffic, and end users noticed a quicker response to their requests for Web pages. The CacheFlow products were reporting an impressive 65% hit rate, which refers to the amount of requested material found in the cache. Vendors put the average hit rate at about 35% to 40%.

But to Smith's chagrin, "the bandwidth we saved quickly got eaten up by something else." The company's 2,000 consultants began to more heavily rely on the remote access links for other applications, and their appetite for Web surfing also increased. As a result, he's been forced to upgrade his Internet access to 32M bit/sec with a variety of fractional T3 connections.

Still, Smith says he loves everything about the CacheFlow appliance, with the exception of its yellow color. Jeff Wade, network information specialist at Science Applications International Corp. (SAIC), a systems integrator based in San Diego, has a similar tale.

About two years ago, he installed Netscape's proxy server, which starts at \$525 for a 100-user license.

Proxy server software is inexpensive compared with caching appliances, but it can't touch the performance, management features and scalability of boxes that are fully optimized for nothing but caching.

Proxy servers have another drawback — to get the system up and running, end users need to point their browsers to the proxy server, which can cause an administrative nightmare. Managers need to reconfigure each browser to send all HTTP requests directly to the proxy server's URL.

Wade supports 25,000 end users at more than 150 locations across the U.S. and has a way to remotely change the settings on the end user's PCs or send IS staff to all the locations.

He sent out notices through various internal channels, but after six months, only 30% of end users had

What is network-level Web caching?

The concept behind caching isn't new. In fact, standard browsers such as Navigator and Internet Explorer automatically cache copies of Web pages to an end user's disk drive. The next time the user requests one of those pages, it's delivered directly from the cache rather than downloaded over the Internet.

Network caching follows the same principle. The caching appliance or proxy server sits at a point many users pass through to access Web content. Every time a user requests a Web page, the cache performs an internal search. If the device finds the page, it sends it to the user; if not, the cache retrieves that page from the Internet and stores a copy.

Over time, the cache grows and the network benefits because the number of pages downloaded from the Web is significantly reduced.

complied with requests to reconfigure their browsers. That meant 70% of end users weren't going through the cache.

Looking for improved performance and better management features, Wade then invested \$60,000 in a NetCache appliance from Network Appliance. That price tag includes 100G bytes of disk space and a redundant power supply.

He set the policy on his Cisco routers so that all HTTP traffic is automatically funneled through the cache. This allows the NetCache appliance to limit in what is known as transparency mode, which eliminates a major administrative burden by removing the end user from the equation.

Wade is getting a hit ratio of about 50%, but a more important measure of bandwidth utilization — actual byte savings — is only about 28%. He explains that the cache contains a lot of icons, images, logos and tiny dots that don't change, so the hit rate for these tiny .GIF files is extremely high. However, the content that needs to be refreshed and downloaded more often includes large data files.

Nevertheless, Wade is pleased with NetCache's overall performance. He's getting two million hits per day and has more than two million objects stored in the cache. "The machine doesn't breathe hard at all," he says.

The caching devices allowed him to forestall an Internet access upgrade for several months, but galloping bandwidth demands forced him to upgrade his 4.5M bit/sec pipe to 10M bit/sec a few months ago.

There must be a cache-ZZ

Cache appliances have their limitations. First, pages with cookies and dynamic pages, such as those generated by Common Gateway Interface scripts, are uncachable, although the vendors claim that those only amount to around 5% of requests.

In addition, caching only applies to HTTP traffic, not to other types of traffic that move over Internet links, such as e-mail and File Transfer Protocol. Also, caching

Caching in

Vendor:	CacheFlow, Inc.	InfoLibria	Network Appliance, Inc.
Product:	CacheFlow	DynaCache	NetCache
Technology guru:	Company founder Michael Malcolm also founded Network Appliances.	Former Boston University professor Abdelislem Herdidey	NetCache software is a commercial version of the Harvest public domain caching software written by Peter Danzig, considered by many to be the father of caching.

Differentiating product features:	CacheFlow opens multiple, simultaneous TCP connections to speed retrieval of pages.	DynaCache addresses the potential problem of the cache becoming a single point of failure with a switch/bridge mechanism that automatically routes traffic past the cache when necessary.	The product measures response time on the fly. If the cache is taking too long to track down a page, NetCache passes additional requests straight through to the Internet.
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doesn't work with pages that are generated through a request made to a database or data warehouse.

Vendors with software-only proxy server products include Netscape, Novell and Microsoft. Caching appliance manufacturers include start-ups CacheFlow, InfoLibria and Network Appliance, which offer boxes that run on proprietary operating systems.

Cisco's caching appliance, Cache Engine, uses a proprietary operating system that works best when it's connected to a Cisco router running IOS. And Infomart is targeting its caching software for SPARC servers at carrier-class ISPs.

James Staton, an analyst at Dataquest/Gartner Group, says caching appliances will come to dominate the market because of their superior performance. ISPs will be buying most of the caching appliances in 1999, but corporate interest will begin to perk up later in 1999.

It all depends on when network professionals begin feeling the pain of user complaints over sluggish performance, Staton says. He suggests network man-

agers start with a large cache at the data center, then consider caching at satellite offices in other countries, because international connections are so expensive. Finally, move to caching at domestic branch offices.

If you have a popular Web site, Staton recommends implementing something

called reverse caching. This entails placing a caching appliance at the Web server so it can deliver frequently requested pages to Internet shoppers. This has the double benefit of offering better performance to potential customers and taking some of the load off the Web server. Christy adds that the market for Web

caching appliances can only grow as companies begin to run more Web-based applications.

He says the bottom line is that disk space costs less than WAN bandwidth, so it makes more sense to store copies of information locally than to go out over the WAN and retrieve it. □

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COMING ATTRACTIONS

The next major event in the caching scene will be the introduction of what might be called third-generation products by powerhouses Compaq and Dell.

The vendors have announced plans to jump into the caching appliance market by licensing Novell's Internet Caching System software to bundle with their servers. Compaq's appliance will be based on the ProLiant, while the Dell offering will include the PowerEdge. Pricing for Dell's low-end model will start at about \$4,500.

Both products are slated to ship this summer.

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The security specialist

An intelligence career prepared Howard Schmidt for the job of protecting Microsoft's network.

BY DEBORAH RADCLIFF

Everyone loves to hate the top dog, and in the world of software vendors, the top dog is Microsoft. And no one hates Microsoft more than hackers. Jericho, a former hacker, calls Microsoft's network the Holy Grail of hackers.

He speculates that almost every hacker entertains the thought of breaking into Microsoft's network for source code or to deface the company's Web page.

So it's no wonder that 18 months ago Microsoft hired a former military cyberspook to build a comprehensive information security unit. After Dave Gasevich, Microsoft's general manager of information services, heard Howard Schmidt lecture on the security problems of the national information infrastructure, Gasevich convinced him to join the company.

The timing couldn't have been better. Schmidt's disillusionment with military bureaucracy was at its peak, and he was more than ready to bail out of the red-tape-plagued Office of Special Intelligence (OSI), an arm of the U.S. Air Force.

During his short tenure in Redmond, Wash., Schmidt has organized Microsoft's scattered security staff into teams and added new players, drawing them all under one umbrella called the Microsoft Information Assurance Program. The teams include:

- A Computer Emergency Response Team, which assists when the corporate network is attacked or spammed.
- The Strategic Technology Group, which handles internal security design and policies, and evaluates security risks for new technology.
- System administrators, who establish secure accounts and domain names.
- An Investigations Team trained in computer forensics, which gathers evidence of attacks against the network or internal misuse of systems.
- A Red Team, which tries to hack into Microsoft's systems to test them for vulnerabilities.

Schmidt has also implemented the InfoSafe user awareness program to heighten employees' awareness of network and data security.

Although it might seem that Microsoft lagged in its efforts to develop a comprehensive security program, the vendor is actually a little ahead in the game, analysts say.

It's rare to find a company that employs a security director like Microsoft does, says Alan Paller, research director for Systems Administration Networking and Security, an education and research cooperative in Bethesda, Md.

Most businesses are just now launching security

units based on their needs and budgets, Paller says. According to a 1998 report from the American Society of Industrial Security, 63% of the 638 companies surveyed said they plan to hire one to 20 security practitioners this year.

A hacker in the purest sense, Schmidt's techno habit grew out of a high school computer timeshare project. By 1976, he had built his first computer, a Sinclair Z-80.

"I had parts all over the place," he says with a chuckle.

Schmidt's dream was to join a small-town police force and retire as chief. He picked the Chandler, Ariz., police department. But in the mid-80s, Schmidt foresaw that white collar crime was going to be conducted with computers. Before he knew it, he became the Chandler Police Department's one and only computer crime expert.

By 1986, he could break into password-protected files in 30 seconds. In 1987, he investigated his first murder case involving a PC; a woman was missing, and her goodbye note was written on her husband's work computer.

"Here was Howard in this little Chandler Police Department helping out the Federal Bureau of Investigations and the Drug Enforcement Administration," says Gail Thackeray, special counsel for technology crimes at the Arizona Attorney General's office in Phoenix.

She recalls a 1986 kidnapping/extortion threat investigation in which Schmidt found damning evidence on an erased hard drive. "The content of the extortion letter was completely erased, but Howard found this little file header 'xtor.ltr' on a backup directory," she says. "It was great evidence—the frosting on the cake."

Most anyone who investigates computer crime knows of Schmidt or his expertise in computer forensics.

When asked if he was a spook during his military days, Schmidt smiles slyly, but won't answer. A former OSI agent who has attended some of Schmidt's forensics classes explains why:

"OSI agents wear two hats: There's the criminal hat for domestic investigations—hacking, drug cases, kidnap, porn, homicide, illegal use of our systems," says Brian Koret, who is now a system security project leader for Consona, a Santa Clara, Calif., application hosting start-up business. "Then there's the counterintelligence hat for investigating foreigners targeting the American government, suspected spies or informants."

While at the OSI, Schmidt grew tired of military poli-



Former military cyberspook Howard Schmidt now puts his talent to use at Microsoft.

tics because they blocked him from doing his job. The need to fight for financial and personnel resources against competing budget interests, government rigidity and lack of teamwork were just a few of the problems. He says there are too many chiefs in the military: "When too many people are in charge, no one is in charge."

From a corporate viewpoint, Schmidt contends that most information leaks are the result of poorly configured operating systems, firewalls and access privileges. And don't even get him talking about executive awareness. "There are still some out there who don't think security about their information assets," he says.

Schmidt also questions the backgrounds of "new" computer security experts and worries they will alter evidence because they haven't taken the time to learn proper evidentiary procedures.

Consolidating Microsoft's information security into one business unit is already paying off, according to Frank Holland, IT director at Microsoft. Security technicians are more proactive and responsive, and employees are getting better at securing their own environments, he says.

That's good because hackers still insist Microsoft is their favorite target, even though the company won't release the number of hacking attempts made against its systems.

"I personally don't advocate attacking any business, but Microsoft is the golden calf of the industry," says New York-based hacker, Yezzer-Ra.

Radcliff is a freelance writer in Northern California who specializes in reporting on big-tech crimes. She can be reached at DeRad@aol.com.

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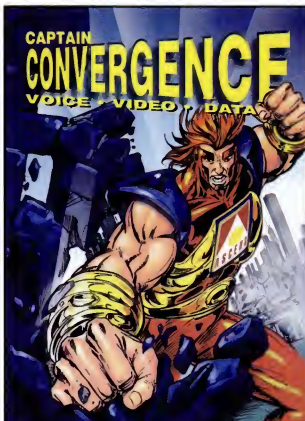
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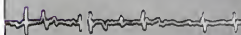
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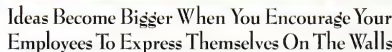
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formula for success is rewritten everyday.

Come join AT&T Solutions as we lead the way in
delivering services and solutions to
comprehensively support the dynamic entity that
the corporate multimedia network has become.

Systems Engineer

Responsible for the design, engineering, and implementation of a customer data
network. Requires in-depth experience in one or more specific data networking
products or services such as Multiprotocol Networking, Internet/VPN Solutions, or
Carrier Services Engineering. The area of specialization must include direct hands-on
implementation experience and industry or vendor certification. Specific areas of
technical expertise include Router Networking (Cisco/Bay Networks), Networking
Protocols (IP/OSPF, SNA), and Networking Services (ATM, Frame Relay, ISDN PRI/RTI).

Integration Engineer

Responsible for the specification and documentation of all physical and logical details for
a network location. Requires in-depth knowledge of the physical attributes of networking
hardware and familiarity with networking services and networking equipment.
(multiplexers, CSU/DSUs, modems) for interfacing to Network Services. Also requires
knowledge of data center design, equipment testing and installation practices; attention
to detail; and excellent PC skills; 3+ years of industry experience and an Associate's
degree in a technical field or equivalent industry training preferred.

Systems Architect

Individual serves as the technical team leader for the design, engineering and
implementation of Enterprise Data Networks, and has overall technical responsibility for
delivery of the solution from project inception through the transition to life-cycle.
Candidates must have a broad understanding of networking technologies and customer
network applications, and in-depth experience in one or more specific data networking
products or services such as Multiprotocol Networking, Internet/VPN Solutions, or
Carrier Services Engineering. The area of specialization must include direct hands-on
implementation experience and possible industry or vendor certification. Good
presentation skills are required; 6+ years of industry experience; and a BS/MS degree in
Computer Science or Engineering is preferred.

Network Engineers

Apply your data networking skills by designing, testing, and documenting router-based
solutions. Develop LAN interconnect solutions/offers using Cisco or Nortel (Bay
Networks) router, LAN operating systems and protocols, AT&T WAN and/or IP services,
and modems/DSUs/multiplexers. Must understand new software and hardware features
and/or releases from router vendors developing solutions. Candidates will obtain
customer requirements, plan and build lab test environments, perform tests, document
solutions, and train technical team members and worker support personnel.

Tier III Technical Engineers

Requires 3-5 years WAN maintenance & implementation experience. CSU/DSU familiarity; a
BS degree; and extensive experience with IOS configuration & upgrade. Cisco/Catelton/Bay
Networks, and IP routing on Cisco products (in a X25 switched network).

Tier II Technical Engineers

Requires 2+ years LAN/WAN experience; a BS degree; 1 year experience IP routing on
Cisco products; and experience with IOS configuration & upgrade and
Cisco/Catelton/Bay Networks. A UNIX background is a plus. Knowledge of HP
Openview and Network Node Manager is beneficial.

Tier I/III Voice Engineers

Requires the ability to manage multiple vendors, maintenance contracts, billing and
escalations in a reactive environment. Strong organizational and escalation skills are
required to coordinate with AT&T Network Management Centers in support of AT&T
client global transport network (VITNS, 800 service). Knowledge of network services must
be complemented with an in-depth understanding of PBX Move, Add and Change
(MAC) PBX features, manual ring down circuits, IT, private lines over IDN, &
CSU/DSU. Understanding of Lucent Technologies (Definity) router (iCOM, Catelton,
Impace, Nortel, Ocie) an added plus.

Systems Analyst

Position requires an Analyst with systems administration skills. Responsibilities will
include administration & day-to-day duties involving:

Software

- UNIX system administration • UNIX • NT & HP-UX software installation
- UNIX shell • HP Network Node Manager 4.1 • HP IT/Operations • Microsoft Windows
- X Windows • Application Administration

Hardware

- HP 9000/7xx Workstations • Sun Sparc • Desktop Workstations (PCs running
Windows NT) • HP 9000/bxx Servers

Others

- Performance management • Problem-solving and decision-making • Basic LAN/WAN
networking concepts • Participates in weekly rotation of 24x7 on-call pager

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Senior Data Engineer
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- Assist sales teams and customers in assessing customer application requirements and developing short-term and long-term data networking solutions.

- Perform pre-sale technical assurance of data networking solutions.
- Provide feedback to Product Mngmt/Mktg on data networking needs of market/customers.
- Conduct knowledge transfer programs to field sales force.

- 5+ years exp. in pre-sale technical sales support or equivalent.

- WAN (e.g., TDM, SONET, FR, ATM, IP) and LAN technologies.
- Data networking equip (e.g., CSU/DSUs, routers, switches, firewalls).
- Internet, intranet, and extranet solutions (e.g., VPN, CIDR, DNS, SMTP).
- Protocols (e.g., FR, ATM, TCP/IP, IPX, SNA, etc.).
- Strong PC, interpersonal, and presentation skills.
- BSEE, BSCS, or equivalent degree pref.

- Establish and maintain the data network architecture.
- Deployment of national Frame Relay/ATM infrastructure.
- Certification/testing of network devices.
- Capacity planning.
- Pre-sales support as required.
- Research and design new products and services.
- Development and documentation of engineering standards.

- At least 6 years of diverse data communications engineering experience of ATM/Frame Relay/IP Router networks.

- Proven track record of accomplishments.
- Good oral and written communication skills.
- Project management skills.
- Frame Relay/ATM network standards & design concepts.
- LAN protocols: RlD, OSPF, IGRP, BGP, PNNl, B-HCl.
- Signaling: ATM/Frames UNI, Q.931, SS7, CAS.
- Management protocols: SNMP.
- Ethernet (10BaseT, 100BaseT), Token Ring, H991.
- Circuits: T-1, T-3, Fractional T-1, ISDN, SDH Hierarchy, SONET, DWDM.
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We are Convergent Communications, a single-source provider of integrated data, voice, and Internet communications services for small and mid-sized businesses. With an enterprise-wide commitment to outstanding customer service, our organization relies on having only the best and brightest talent to support our mission. Simply put, our mission is to allow clients to focus on their core business opportunities, not the technology supporting their objectives.

As an employer, Convergent Communications is committed to the ongoing development of a culture that encourages personal development, career-path opportunities, and "outside-the-box" thinking. We realize that our employees are our greatest asset. As such, we offer them and their families excellent benefits and compensation.

To take the next step toward fulfilling your career and personal ambitions, send your resume and salary history to: Convergent Communications Services, Inc., ATTN: HR and Inquiries, Three South Shore Blvd., Englewood, CO 80112. FAX: (303) 749-3009. e-mail: hr@convergeny.com

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DATA, VOICE, AND NETWORK SERVICES

The following opportunities are available in Atlanta, Baltimore, Dallas, Denver, Des Moines, San Francisco, Salt Lake City, Seattle, Chicago, Los Angeles, and Portland.

Internet Services

The Internet Services group is responsible for providing an Internet Web presence to clients, supporting their Internet, intranet, and extranet needs. We provide custom Web site and application design, Internet access, and hosting and consulting services. We are seeking team-oriented professionals to fill the following positions:

- Internet Sales Support Specialist
- Project Manager
- Design Director
- Production Director
- Graphic Designers
- Programmers
- Webmaster
- Proposal Support Manager

Enterprise-POP

This division designs, develops, introduces, and manages the lifecycle of Convergent's product and services portfolio. Product/service sectors include professional consulting services, data voice/video products integration, as well as carrier services. Our current service offerings include, but are not limited to: IP, ATM, frame relay, VoIP, and other services.

- Network Sales Support Manager
- Sales Engineering Specialist
- Local Service Sales Engineer

Enterprise Network Services

This division develops, supports, and manages the long-term relationship with Convergent clients as their communications system partner. Our goal is to provide world-class delivery, program management, and preeminent client care. To accomplish this, we are seeking professionals who possess a proven record of developing, supporting, and managing such client relationships in combination with exceptionally strong oral and written communications skills, and the ability to anticipate the needs of our clients and manage the entire delivery lifecycle support process.

- Business Integration Coordinator
- Director of Tech Engineering
- Director of Sales

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CLIENT BUSINESS MANAGER

This position demands expertise in developing business solutions at the highest levels of a customer's organization. Competitive awareness is the key, along with knowledge of client voice and data network applications and emerging technologies. A minimum of 3 years' sales experience in a business selling environment, a solid knowledge of telecommunications, and a Bachelor's degree required. AT&T product knowledge and an MBA are highly desirable. Job Code: NNW90510060.

INTERNET PROTOCOL NETWORKING CONSULTANT

As a member of the AT&T team, you will apply sophisticated e-commerce and data network applications to meet a broad range of business challenges. Qualified candidates will possess a unique combination of skills and expertise including a minimum of 2 years' successful outside sales or consulting experience in e-commerce Internet/Intranet applications, together with a working knowledge in several of the following areas: LAN/WAN, Routers, and Firewalls/ATM/Frame Relay. Job Code: NNW90510046.

DATA SALES EXECUTIVE

As a member of the AT&T team, you will demonstrate a unique combination of sales skills and data networking expertise. Your main goal will be to identify opportunities to expand our customer base by using a consultative approach as you provide technical expertise to potential and existing business clients. Qualified candidates should have a strong knowledge of data networking technology and applications, client/server environments, routers, protocols, and local area networks. Bachelor's degree preferred. Job Code: NNW90510065.

All positions listed above require telecommunications experience. Only candidates with telecommunications experience will be considered.

AT&T wants you to build your capabilities and grow with us. We are committed to your development by offering state-of-the-art technology and immense resources to fuel your growth as well as generous salaries and benefits. Qualified candidates should FAX their resume and cover letter (indicating appropriate Job Code from above) to: (973) 984-7324. Or e-mail to: adms@att.com (ASCII text only, no enclosures). You must reference appropriate Job Code from above in resume or cover letter, or as subject of email.

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NetZero, one of the hottest High-Tech Startup Companies, is changing the way people perceive and use the Internet. The NetZero team is comprised of industry leaders dedicated to innovation, and as we continue to grow, our need to add great talent increases. If you embrace the Web and have a vision for the future, we want to hear from you. The following positions are immediately available:

SENIOR UNIX SYSTEMS ADMINISTRATOR (JOB CODE: SA/NTW)
Reqs: 3+ years Network Engineering experience including ISP, UNIX, routing & NFS.

OPERATIONS MANAGER (JOB CODE: OM/NTW)
Reqs: 3+ years management experience including knowledge of running a 24/7/365 Operation. ISP experience is a plus.

SECURITY ARCHITECT (JOB CODE: SA/NTW)
Reqs: 3+ years security experience in a heterogeneous IP environment. ISP experience is required.

We offer highly attractive compensation packages with outstanding benefits including 401(k) plan and stock options. For immediate consideration, please fax your resume to 818-679-7257. Attn: HR Mgr, Job Code: Or e-mail: randen@netzero.net net Job Code in the subject field. EOE.



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Channel Sales

Locations: Chicago/Midwest

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Applications Engineers

Locations: Great Lakes, Miami/FL area.

California, Germany, Belgium/Netherlands.

Provide technical pre-sales support to our customers and distributors in all technical areas of NetScout products. Must have 4+ years' experience and strong skills in network technology, network applications and UNIX/NT.

Post-Sales Field Engineers

Locations: Dallas, Chicago, DC, San Francisco

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New positions are always opening in different territories. For complete details and a list of other available positions, please visit our Web site.

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REQUEST FOR INFORMATION # 99RFB04 COMMUNICATIONS NETWORK PROJECT & PUBLIC ADDRESS/CUSTOMER INFORMATION SCREENS PHASE II PROJECT

The New York City Transit Authority is engaged in Multi-phased projects to upgrade the NYCT communications network and customer communications systems. The Communications Network will support multiple applications for improving transit, interagency voice, data and video communication over a single network, utilizing fiber optic cable with Sonet and ATM equipment. An RFP tentatively scheduled for release in 1999.

The Public Address/ Customer Information Screens Phase II (PACIS) project will provide a modern public address system utilizing microprocessor controlled electronics. CIS units will provide customers with train arrival information along with other relevant announcements. PACIS will be a centralized system with secondary remote control locations and will interface with other systems under development including Automatic Train Supervision (ATS), Subway Train & Traffic Information System (STTIS), Communication Based Train Control (CBTC) & PACIS Phase I. NYCT seeks comments on the technical specifications for each of the projects. There is one RFI for both projects as it was conceived as one project and will be split into two distinct projects after the RFI is completed.

Firms possessing the requisite qualifications and desirous of responding can obtain a copy of the Request for Information on or after April 28, 1999 by leaving a request on company letterhead and include RFI number and date to (718) 994-0564/210 or by mail to: MTA New York City Transit, PO BOX 620831, Brooklyn, NY 11202-0831, Attention: Bids Document Requests. RFI documents may also be obtained in person from the bid Reception Desk at 130 Livingston St., Brooklyn, NY between the hours of 9:00 AM-4:00 PM, Monday to Friday except holidays. Responses are requested no later than June 2, 1999. Following this written submission RFI may choose to meet or correspond with selected RFI respondents for further clarification. This is a Request for Information, not a solicitation.

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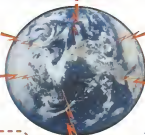
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NS80 - The Net/Station NS80 network enclosure is designed to house 19" rack mount equipment. With 42U of mounting area, the NS80 provides ample space for your network equipment. The front and rear doors as well as the side panels are keyed alike to provide security for critical equipment. Cable entry/exit through the top and bottom allows complete functionality and provides an aesthetically pleasing server cabinet for any environment. The NS80, like all Net/Stations, is expandable by connecting multiple enclosures together.



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126 Network World May 10, 1999 www.nwfusion.com

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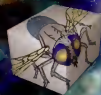
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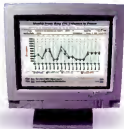
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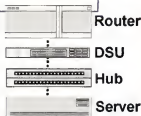
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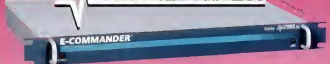
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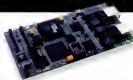
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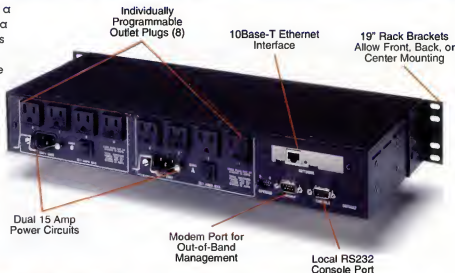
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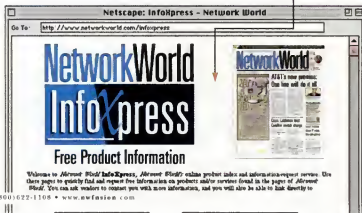
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HP snubs EMC with new network storage plan

BY DENI CONNOR

NEW YORK — Hewlett-Packard last week introduced a comprehensive — and controversial — storage-area network strategy that pits the company against longtime storage partner EMC.

The strategy, dubbed the HP Equation, is comprehensive in that it includes a multiterabyte-disk subsystem, a Fibre Channel switch and storage management software for mainframe, Windows NT and Unix servers.

The strategy is controversial in that HP's new high-end disk array, the SureStore E Disk Array MC256, will be sold by HP under an OEM arrangement with Hitachi Data Systems, a chief rival of EMC. HP has been a major EMC reseller, with sales of EMC's Symmetrix products through HP accounting for about one-fifth of EMC revenue last year.

HP explained its shift away from EMC by saying EMC's products weren't open enough to meet customer requirements. However, observers critical of HP's partnering with Hitachi say that the MC256 is basically a knockoff of EMC's technology and is just as proprietary.

For its part, EMC issued a statement suggesting that the company will battle aggressively to win business in HP accounts.

Will still sell EMC gear

HP will continue to sell Symmetrix storage products if customers want them, but the company will focus on developing a top-to-bottom product offering that includes technology from HP, Hitachi and other companies.

HP will sell the Hitachi disk subsystem, which can hold up to 9 terabytes of data and supports data mirroring, for \$250,000 and up. HP's new storage product collection also includes a 16-port switch, dubbed the SureStore E Switch F16, which is made by McData. HP also introduced SureStore E Storage Node Manager, software that customers can use to discover, map and monitor storage devices across a network.

While analysts, EMC and HP predict a battle for storage customers, users interviewed last week didn't seem fazed by the HP-EMC breakup.

"It doesn't really matter who I get storage from," says Ken Johnson, chief information officer for Pepsi-Cola Bottling Group. "I didn't buy EMC because of HP. I bought EMC because of the technology they had to offer."

"I don't see anything stopping me from introducing another vendor, such as HP or Hitachi, into my environment," he says. "I'd be foolish not

to want to learn about it."

In other HP storage news last week, the company announced the acquisition of Transoft Networks, a

60-employee firm in Santa Barbara, Calif., that makes storage management products for Unix and NT networks.

HP plans to integrate Transoft's technology with HP's Storage Node Manager. ■

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ION, continued from page 1

is unavailable to customers who want to use the network for voice, video and data — the way the service was advertised.

According to Sprint's brand-new tariff for ION — an integrated-access service employing an ATM premise device to concentrate all traffic types over broadband links — users can buy service at a rate of 45 cents, 67 cents or \$1.34 per megacell, or one million ATM cells. *Network World* obtained the tariff last week after Sprint quietly filed it with the Federal Communications Commission.

The highest usage rate applies to circuits carrying traffic that cannot bear any delay. The middle rate applies to traditional LAN interconnection traffic, and the low rate applies to low-priority store-and-forward applications.

The problem? Sprint reveals in the tariff that it cannot yet bill for ION voice and video traffic based on usage. Network professionals who want to put both voice and data traffic on the network must choose a second billing option: circuits with traditional

all monthly flat fees.

At T1 speeds, the flat-rate circuit price is \$3,429 per month for the highest service level, equivalent to ATM's constant bit rate (CBR) class of service. The price for the middle option — equivalent to ATM's variable bit rate (VBR) non-

ION's complicated dual-price structure presents some dilemmas for users, according to analysts who also got their hands on the tariff as it was filed.

For those who can use them, the usage-based fees are quite attractive compared

up to 5 cents per megabyte. But because the ATM-based Sprint ION service is priced per megacell, and a cell contains 53 bytes of information, even the highest ION usage rate (\$1.34) gives you more bang for the buck than frame relay usage plans, even after

A Sprint spokesman says many users so far have actually said they prefer flat-rate billing because it is simpler and more predictable. But for those who do choose flat-rate billing, another potential problem arises: Sprint has left out an expected service class between the high option (called Service Level 1) and the middle option (called Service Level 3).

The missing class, which the ION tariff says would be called Service Level 2 if it were available, is equivalent to ATM's VBR real-time. It's designed for robust data applications that tolerate little latency.

Users who want that kind of circuit — say, for enterprise resource planning applications — may have little choice but to go to Service Level 1. And those rates appear to be priced above most carriers' frame relay port prices for equivalent speeds, though Pierce says they beat AT&T's prices for CBR ATM.

Research Assistant Deldre Massenberger contributed to this story.

Get out your calculator

Between any two corporate sites, Sprint ION charges a monthly site-to-site transport charge that varies depending on the class of service and the amount of reserved bandwidth:

Line speed	Service Level 1	Service Level 2	Service Level 3	Service Level 4
64K	\$143	n/a	\$94	\$38
128K	\$286	n/a	\$179	\$39
256K	\$572	n/a	\$266	\$39
T-1	\$3,429	n/a	\$1,715	\$89
T-3	\$64,296	n/a	\$32,148	\$2,304

Notes:

- Service Level 2 is not yet available. Users needing that class of service for data applications may have to begin with Service Level 1.
- Used prices require a two-year term commitment. Three-year contracts will be available at slightly lower prices. Additional charges apply for access lines.

Service Level 1

Equivalent to ATM constant bit rate (voice and video)

Service Level 2

Equivalent to ATM variable bit rate (VBR) real-time traffic (delay-sensitive data applications)

Service Level 3

Equivalent to ATM VBR non-real-time traffic (LAN interconnection)

Service Level 4

Equivalent to ATM unspecified bit rate (low-priority store-and-forward traffic)

Copper, continued from page 1

installed in enterprises. Some observers say copper versions

false starts from PHY chip manufacturers, according to gigabit equipment vendors.

One of the most prominent chip makers, Broadcom, sup-

ports with fees for traditional carrier services, says Lisa Pierce, a telecom analyst at Giga Information Group. Some usage-based frame relay offers from carriers such as MCI WorldCom and Qwest are priced at

allowing for ATM's relatively high overhead.

"The usage option is clearly a better buy unless you happen to be an incredibly high-volume user, which is unlikely at this point," Pierce says.

expected to ship soon after equipment vendors receive the chips. "Our boards are totally ready," says Drusie Demopoulos, vice president of marketing at Foundry Networks. Demopoulos says it will take about a month of tests after getting the chips before Foundry can offer commercial products.

Similarly, Alcon has had its NICs ready since last October's Interop and is just waiting for PHY chips.

Extreme Networks hopes to demonstrate 1000Base-T on its BlackDiamond switch this week.

Much unresolved

Despite the anticipated payoff of Category 5 equipment, vendors agree that initial 1000Base-T products won't be much cheaper than their fiber counterparts — at least, not initially.

As copper prices fall, fiber Gigabit Ethernet product

prices will be forced down as well.

The price difference will be an important factor in users' decisions. "If the price is close, you might as well go with fiber," Ohio State's Lindemann says.

Copper-based Gigabit Ethernet technology also faces a challenge in that it is unproven in real-world environments. "I would be concerned about the reliability and performance of Gigabit Ethernet over copper," says Mike Ackermann, manager of network planning and design at Blue Cross/Blue Shield of Michigan in Detroit.

Another consideration is that the distance of the copper version is limited to 100 meters, while fiber Gigabit Ethernet can stretch for kilometers (see story, page 36).

On the standards side, 1000Base-T is due to be ratified by the IEEE in September.

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of Gigabit Ethernet products could cost up to 50% less than fiber ones.

It will be easier to extend Gigabit Ethernet across more servers once a copper version of the technology is available, says Kurtis Lindemann, network specialist at Ohio State University's college of business, which already uses Gigabit Ethernet over fiber.

In a couple of years, a copper version also may open the door for Gigabit Ethernet to the desktop, he adds.

But developing the physical layer (PHY) interface for the copper version has been difficult, leading to numerous delays and

plies Alcon, 3Com, Cisco, Nortel Networks and others.

Last August, Broadcom announced it would have copper Gigabit Ethernet prototypes ready at the end of 1998.

Last week, Broadcom rival SERQ Technologies also revealed it will have sample PHY chips ready this summer, with volume shipments in the fall.

Switches and NICs built on the new PHY chips are

Bringing up Gigabit

Gigabit Ethernet has been working its way through the IEEE for several years:

March 1996

Project authorized for Gigabit Ethernet over fiber.



March 1997

Project authorized for Gigabit Ethernet over Category-5 copper.

July 1998

Last significant technical changes to copper draft standard.



March 1999

Original IEEE target date for copper-based standard ratified slips to September.



May 1999

Broadcom demonstrates working copper-based chips



September 1999

Copper-based standard ratification expected.



V-ONE breaks through encryption export barrier

BY ELLEN MESSMER

GERMANTOWN, MD. — A small security vendor, V-ONE Corp., broke through the U.S. government's encryption export barrier, receiving Commerce Department approval to ship its virtual private network gear (VPN) almost anywhere in the world.

Companies will be able to use V-ONE's SmartGate VPN, which uses strong Triple-Data Encryption Standard (DES) encryption, in about 140 countries without having to go through a case-by-case approval process.

V-ONE cut through the red tape because its SmartGate VPN for enterprise application encryption uses a trusted first-party key-recovery method that the FBI and National Security Agency (NSA) approved after more than a year of evaluation.

V-ONE received approval by providing a way for companies using SmartGate to decrypt data at the request of law enforcement — without the encryption user surrendering his private key. Analysts predict the rest of the security industry will have to heed the regulatory victory.

"Other vendors are going to have to follow suit here to get the same type of approval in order to remain competitive," says Jeffrey Johnson, president and CEO of Meta Security Group in Alpharetta, Ga. "The vendors are tired of being limited by these government rules."

And so, of course, are users. Government encryption regulations have often hindered corporations from using the same products internationally that they use at home, which jeopardizes network security and confounds interoperability.

How did V-ONE get this unprecedented break from the Department of Commerce? The SmartGate client/server-based VPN has a feature called KRAKit, which allows designated corporate employees to decrypt application data encrypted with SmartGate.

This differs from the trusted third-party approach pushed by the FBI and NSA, which would require a corporation to escrow encryption keys with an outsider.

"We looked at the regulations, and

met with the Bureau of Export Controls and the FBI repeatedly," says Dave Dawson, V-ONE's CEO. "We came up with what we call the trusted first-

party mechanism, whereby a company can 'recover' its own keys, should law enforcement require access to data."

With the Commerce Department's

approval, V-ONE becomes the only security vendor with Triple-DES encryption, which can be easily exported to most countries by any type of organization — not just banking, insurance or others that have special privileges under the export rules. ■



V-ONE's Dawson: His company devised a security scheme that pleased everyone.

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Cabletron,
continued from page 1

help users prioritize traffic based on the particular application so they can allocate bandwidth accordingly.

This Layer 4 QoS and security feature is also important for users looking to run

voice and video over their data nets because those applications require more bandwidth and less network delay.

"One of the things we want to do is begin to shove some video across our network," says Craig Timmons, director of university computing at the University of Charleston in Charleston, W.V.

"Layer 4 will help with that and with securing IP addresses."

The firmware upgrade to Cabletron's SmartSwitch 2000, 6000 and 9000 will allow users to download Layer 4 QoS and security software into flash memory on those switches. The software will enable the switches to classify, prioritize

and filter traffic by reading the TCP and User Datagram Protocol (UDP) port numbers of the applications running on the network.

TCP/IP-based applications are assigned TCP and UDP port, or socket, numbers that identify the application for host-to-host connections.

Once this information is known, the switches can apply one of several classification and queuing standards in the switches — 802.1p, Differentiated Services, weighted fair queuing and class-based queuing, to name a few — to prioritize the traffic based on urgency or bandwidth needs.

Timmons was pleased that the Layer 4 QoS and security enhancement is a firmware upgrade: "I just download the

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code on the switches and away I go." But Timmons cautioned that he has not yet received the upgrade, so he does not know if it works as advertised.

To enhance the new Layer 4 QoS features, Cabletron will also unveil switching modules for its high-end SmartSwitch 9000 that double the switch's current port density and increase performance fivefold.

The new modules allow for up to 336 10/100M bit/sec ports or 56 Gigabit Ethernet ports in a single chassis. Performance now scales to more than 35 million packet/sec and 45G bit/sec of bandwidth, Cabletron says.

There are six new modules for the SmartSwitch 9000, including two 16-port 10/100M bit/sec Ethernet boards, one with an ATM or FDDI uplink, and the other with dual Gigabit Ethernet ports.

The new modules also include three 24-port 10/100 boards: one with copper interfaces, the others with either single-mode or multimode fiber interfaces. The last new module is a four-port Gigabit Ethernet card.

For interconnecting the high-performance, QoS-enabled workgroups, Cabletron will roll out the SmartSwitch Router 2100. This new router sports eight fixed-configuration Gigabit Ethernet ports for dedicated server farm connectivity.

The SmartSwitch 2100 is intended to go up against Nortel Networks' Accelar 1000 and Foundry Networks' Turbostream Layer 3 switches, and Extreme Networks' fixed-configuration Gigabit Ethernet offerings.

The SmartSwitch Router 2100 is priced at \$1,250 per port. It will ship in June. The new modules for the SmartSwitch 9000 cost from \$7,200 to \$21,000 and will ship in August. The Layer 4 QoS and security firmware upgrade costs \$250 and is available now.

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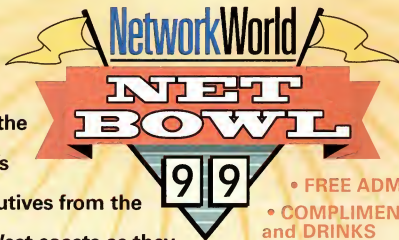
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In any event, the TGX 8750 was supposed to serve as

"They've renamed a bunch of products, but I haven't seen much more than that," says Bob Bellman, president of BrookTrail Research in Natick, Mass. "Nothing exciting, anyway." □

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Boiling frogs and boiler rooms

am told that boiling a frog is easy. You put the hapless amphibian in a pot of cold water and heat the pot slowly. The frog, being coldblooded, has no reference for what its body temperature should be and heats up along with the water until it is boiled.

Before you assume that I've changed my dietary habits, please note that I am not offering this as a recipe, but rather as an analogy for what is happening to many IT organizations.

The culprits are, of course, the Internet and electronic commerce. We all get heated up by online business, and if we're not careful, before we know it many of us will be killed off — boiled — because

we're not adapting well to the changing environment.

History is behind the problem. IT started out as a cutting-edge service and grew to become the infrastructure that makes modern business possible. In short, you IT chaps are superstars! At least you should be superstars.

Unfortunately, many of you have been reluctant to running the "plant." A hugely important plant, but a plant nonetheless.

The plant is something we associate with, for example, the boiler room. In the boiler room people are doing mysterious things with furnaces, pipes, gauges and valves. But who thinks about his company's boiler room? It has become forgotten infrastructure.

Could networks become forgotten infrastructure? Sure, if you let them.

If, for example, you let the job drive you instead of vice versa, all the skill will drain away. I've talked to many IT professionals who complain that the volume of work means that their jobs are to run around fire-fighting — they are operating tactically.

Now that's not to say tactical tasks are wrong or can be avoided.

Indeed, it isn't possible to run a service of ad-hoc maintenance — something that is essentially tactical — being required. But when the majority of your work becomes tactical, it is the beginning of the end.

If you are so busy with minutiae that you loose sight of the big picture, your role in the organization will change. Good-bye forever to superstar status. This is the being boiled alive that I'm talking about. When you're tactically driven, you don't notice that your goose (or frog) is in the process of being cooked.

We'd like to think that IT is involved in the strategic area of business process improvement, but translating existing business practices into computerized processes is not a strategic role. You can see this kind of mistake on the Internet. Many Web sites fail to improve on the way business is done — they merely replicate existing business methodologies online.

For example, I was trying to order a product from a Web site the other day, and the vendor's strategy for providing service was to display the order form on a Web page and tell me to print it and fill it in on paper. The form was badly laid out and complex, and it wasn't obvious how shipping charges would be applied.

Here's where IT should have grabbed the frog, er, bull by the horns. IT should have seen the opportunity to improve how things were done and provided an interactive process that produced a complete, correct form.

Hell, a machine-readable form could be easy to create. But I bet the IT folks were more occupied with tactical stuff.

The only group that can make your company successful is your group — the IT group.

But if you are obsessed with running the plant, you are not involved with strategic issues. And you run a very big risk of being boiled.

Feeling hot? Frog recipes to nwcolumn@gibbs.com.

The increasingly giddy legions of Linux devotees received a love letter last week from those smart-talkers at Kleiner Perkins Caulfield & Byers.

The Kleiner Perkins missive was actually addressed to **Linuxcare, Inc.**, a San Francisco start-up, the arm of an undisclosed sum of first-round venture capital. This kiss is more than just a kiss for Linuxcare, however, in that it also shows the smart money has fallen hard for the darling of the open source software movement.

Linuxcare, as the name suggests, sells technical support for various strains of the Linux operating system being hounded by the likes of Red Hat, Caldera, Pacific HiTech and SuSE. Corporate IT types often call the lack of such support reason enough to steer clear of Linux.

"There's a very good business to be made supporting all flavors of Linux all over the world," says **Ted Schlein**, the Kleiner Perkins general partner who sits on Linuxcare's board. "The funding is a statement about Linux, but it's also a statement about open source."

How enamored of Linuxcare is Kleiner Perkins? Well, the entire courtesy — from first pitch to funding commitment — "took only six weeks," says **Art Tyde**, a Linuxcare founder. Life is a bed of roses for everyone and everything Linux these days. So being a journalist and hating good news by nature, I had to ask Tyde where a leftist the thorns lurk.

"There's this sleeping behemoth out there," he says. "I don't think Microsoft has really started to fight back."

As of these keystrokes, **Jeff Papows** remains CEO at Lotus. This is true despite a full week's worth of giggling inside and outside the company over a painfully embarrassing *Wall Street Journal* article that painted Papows as a serial briber on details about his military, educational and family backgrounds.

While some insiders say privately he's toast, Lotus officialdom continues to insist that the story is much ado about nothing. Parent company IBM has said nothing at all.

Prediction: They're stalling. A CEO other than Papows will welcome the faithful at next January's Lotusphere.

Of course, you might want to keep in mind that this prediction comes from a guy who would have a bit less nial that no president could survive a sex scandal involving an intern.

Remember all the hoopla two weeks ago about those 16 IT professionals who were auctioning their services to the highest bidder on eBay? Here's a new twist.

Monster.com, the King Kong of online job sites, will launch **Monster Talent Market** on July 4. The idea is to let companies bid on the services of independent contractors, consultants and freelancers. Check out <http://talentmarket.monster.com> for a preview.

What follows are all 122 words of an actual first sentence of an actual press release, obviously written in the author's native gibberish:

"Hummingbird Communications, Ltd. (NASDAQ: "HUMC" and TSE: "HUM") and PC DCS Group International, Inc. (TSE: "DCX" and NASDAQ: "DCGS") today announced that they have agreed to amend the arrangement agreement dated March 4, 1999, (providing for the acquisition by Hummingbird of PC DCS Group by way of a Plan of Arrangement on the basis of one-third of a share of Hummingbird for each share of PC DCS Group) by extending the period under the arrangement agreement, in which each of Hummingbird and PC DCS Group is to respond to the announcement on April 29, 1999, by Open Text Corporation, that it will offer to acquire, at a price of \$8.50 cash per share, 100% of the common shares of PC DCS Group."

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